

PROGRESSIVE
MEDICINE





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1917

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PROGRESSIVE MEDICINE

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES
AND IMPROVEMENTS

IN THE

MEDICAL AND SURGICAL SCIENCES

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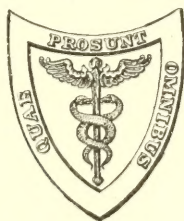
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VOLUME III. SEPTEMBER, 1917

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS
AND BLOODVESSELS—DERMATOLOGY AND SYPHILIS—OBSTETRICS—
DISEASES OF THE NERVOUS SYSTEM.



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PROGRESSIVE MEDICINE.

SEPTEMBER, 1917.

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS, AND BLOODVESSELS.

By WILLIAM EWART, M.D., F.R.C.P.

THE RESPIRATORY FUNCTION.

THE third year of the world's war has contributed its heavy share to the accumulating material for pathological and clinical study. It has happily not engendered any new type of epidemic camp disease, or recorded any aggravated recrudescence of those in the past. This is largely due to the progressive experience and organization of the medical service, and to the lessons it had learned from two previous winters of trench warfare. Another phase, which will tax its resources under entirely different conditions, has been initiated in the early spring by the long-delayed outbreak of hostilities in the open. They afford less time and opportunity for the keeping of records and for their elaboration for publication. This report cannot, therefore, include much of that recent medical history. It bears simply upon the retrospective literature of antecedent experiences at the front, and upon the current reports from civilian practice.

The Various Factors of Respiration in Persons with Pneumothorax have recently been studied by J. H. Means, and G. M. Balboni. The conclusions they report in the *Journal of Experimental Medicine* for 1916 are to the following effect: At rest all the factors of respiration, gaseous exchange, carbon dioxide tension, and the mechanical factors, are normal in persons with a collapsed lung; the well-known reaction to carbon dioxide resulting in more rapid breathing is normal up to the point at which respiration is trebled or sometimes quadrupled; but beyond this point a limit may be reached. One lung is as efficient as two, except when an increase at least threefold in contrast with normal ventilation is called for. This fact has an obvious bearing upon the therapeutic question as to artificial pneumothorax. It might perhaps be suggested that it bears indirectly upon the etiological question as to

the localization of tubercular infection to the apex. The relative superabundance of unused, though available, breathing tissue increases with depressed bodily activity; but presumably much more in the least expansile of all thoracic regions, namely at the apex. The depression of apical ventilation, and with it apical circulation, to a minimum might be answerable for the constancy displayed by the bacillus in the regional selection of its early settlement.

Cardiac Dyspnea. Prof. Francis W. Peabody's lecture before the Harvey Society of New York on March 17, 1917, lucidly sums up the results of the labors of modern physiologists, including his own notable contribution, in their application to cardiac pathology. Dyspnea, in its true Greek meaning, is stress of breathing with discomfort. Its analysis discloses two varying features: "Tachypnea," Hippocrates' original term for undue frequency, and "hyperpnea," a new designation, applied to a recent physiological observation, for undue volume of pulmonary ventilation. "Polypnea" is an awkward word, but avoided because ambiguous and non-discriminating, and confusingly applicable to either, or to both, of those two definite respiratory values. It is now well-known that the essential stimulant and regulator of the normal pulmonary ventilation (on the average 5 liters per minute, at rest) is CO_2 , to which the respiratory center responds with extreme sensitiveness, responding also similarly to other acid bodies in the circulation. As CO_2 is the main product of normal vital exchanges, a normal metabolism is the basic factor in the control of respiration, and abnormality of metabolism is the first of its modifying factors in cardiac malfunction. A large "respiratory reserve," or available expansibility of the average ventilation of rest which can be expanded 10 or 11 times before dyspnea is induced is characteristic of health. The 5 liters may grow, under strenuous exertion, up to 48 to 80 liters per minute according to individual weight, sex, and muscular power. In cardiac affections, the clinical variability in the onset and intensity of dyspnea is first of all dependent upon the metabolism. Its study in the Sage calorimeter, or by means of the method of respiration calorimetry, has identified two main groups: In the first, that of good compensation, the metabolism varies within normal limits; in the second there is more or less metabolic increase, with more or less failure of compensation. But the uncompensated did not all present an increase. Therefore that factor is a variable causal factor of dyspnea in cardiac disease. The minute volume was next studied, namely "at rest." It was within the normal in the well compensated; much raised in severe decompensation. But that difference in the hyperpnea bore no relation to the individual metabolism. A high minute volume is thus proved to be a factor of considerable importance in the production of cardiac dyspnea; for, if the minute volume at rest was high, it left a much restricted range for increase under conditions of exertion, even if mild.

A few years ago the occurrence of acidosis in heart disease was used to account for the occurrence of dyspnea in practically all cases. More extensive study has shown that in pure cardiac disease in compensation there is no increase in the hydrogen-ion concentration of the blood. In

acute loss of compensation it varies, although in many there was some increased accumulation of CO_2 in the blood, probably due to factors in the lungs which interfered with its diffusion. Thus CO_2 accumulation is a factor of importance in the production of dyspnea only in the most severe cases of non-compensated pure cardiac disease. Where, however, there was an associated renal involvement, the increase in the acidity of the blood was of great importance. When the phenolphthalein output was normal, there was no acidosis. When the output was reduced, acidosis was usually present; and when there was no excretion of phthalein, acidosis was always very marked. In the second group the acidosis was alone of little importance as a cause of dyspnea, for it was usually relatively slight. It, however, diminished the buffer action of the blood salts and increased the sensitiveness of the respiratory center to the accumulation of carbon dioxide. And in the milder cases of this type the administration of alkalies was of material benefit.

The preceding factors produced a demand for an increased minute-volume of respiration, to meet which both rate and depth of respiration would have to be augmented. The capacity for increasing the depth of each respiration was then studied and was found to be impaired in many cases, thus further preventing the patient from meeting the demand for increased ventilation. The vital capacity also was found to be decreased in many cases; and its decrease was more or less parallel to the loss of capacity for increasing the depth. Thus the following findings were recorded: (1) When the vital capacity was at least 90 per cent. of the normal, the patients were well compensated and had little or no tendency to dyspnea. (2) All those with a vital capacity between 70 and 90 per cent. had some dyspnea on unusual exertion, but could get about with fair comfort and little restriction. (3) In the group with vital capacities between 40 and 70 per cent., there was dyspnea on moderate exertion and many had frequent attacks of loss of compensation. (4) All those with vital capacities less than 40 per cent. presented severe loss of compensation, severe dyspnea, and a bad prognosis, 61 per cent. having died in a short time. It was thus shown that the decrease in vital capacity ran parallel to the tendency to dyspnea and was a fairly accurate measure of it.

The causes of this decrease are many: Pleural and pericardial effusions, emphysema, pulmonary edema, or often loss of elasticity of the lungs from engorgement and back pressure on the right heart. In short, the vital capacity remains the same as long as the clinical condition is constant, and gives a rough quantitative measure of the clinical condition where dyspnea is the presenting symptom. It is often of more value in this respect than the blood-pressure or the pulse-rate.

Periodic respiration is commoner than is usually believed, but, as yet, no full explanation of its cause could be offered. It was proved not due to acidosis, for the blood carbon dioxide was not abnormal. It is a normal phenomenon in many persons in sleep, and is known to be aggravated by respiratory depressants, such as morphine. It seems to be best explained as due to an alteration in the excitability of the respiratory center, and possibly in part to some lack of oxygen. It can be checked

temporarily by the administration of caffeine, which is a powerful stimulant to the respiratory center.

"Buffer Salts" Inadequacy in "Irritable Heart" Breathlessness. This latent subtle factor is expounded in the report of a research by Thomas Lewis,¹ Cotton, Barcroft, Milroy, Dufton, and Parsons. The normal stimulus of the respiratory center is the tidal fluctuation in the alkalinity of its blood supply which is due to CO_2 and lactic acid production. The same applies to the intensified stimulus from exertion or from acidosis. The basal fact now brought to light is a controlling and restraining chemical mechanism, special to the blood, over the intensity of its de-alkalizing reactions and of its medullary stimulations. A given addition of CO_2 to "blood" only produces a quarter of the change in

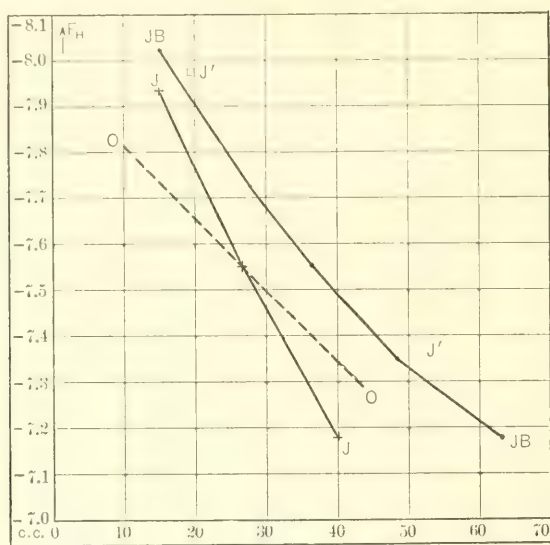


FIG. 1. - The vertical figures denote the logarithms of the concentration of hydrogen ions in the blood (P_H).

reaction which it would produce in a corresponding quantity of physiological "saline solution." Thus, if 100 c.c. of blood be taken and the same quantity of normal salt solution, 1.3 c.c. of CO_2 dissolved in the saline would change its reaction to the same extent as 5 c.c. would change that of the blood. The reason is that the blood contains sodium bicarbonate, monacid and diacid sodium phosphates, and protein, which partly fix the excess of CO_2 , namely, three fourths of it. These salts thus practically act as "buffers" for the respiratory center.²

¹ British Medical Journal, October 14, 1916.

² The present research arose from one by Lt. Drury, on the carbonic acid in the alveolar air and the effect of breathing small quantities of that gas. As he was detailed for service abroad, his valuable assistance was lost. Variations in the "buffer" value of human blood have been found by Levi and Rowntree, Archives of Internal Medicine, xvii, 525.

In confirmation, we were actually able to impose the properties of normal blood upon that of one irritable-heart patient, by the addition of "buffer" salts. The blood of J., before we did this, had a change of reaction of 0.119 as compared with the normal 0.045 to 0.06. It was compared with the blood of J. B., a much older person, normal in the sense that he is not unduly dyspneic for his age on taking exercise, though he possesses a history of functional cardiac trouble. The comparison is shown graphically in the figure in which the reaction of the blood is plotted vertically in units corresponding to P_H .

The line indicated by the letters *JB-JB* shows the changing reaction of J. B.'s blood when it contains the quantities of carbonic acid shown successively by the abscissæ. The line *J-J* shows that of a case of irritable heart. Note that the line, especially at the lower end, which represents the usual carbonic acid conditions in the body, is much steeper in the case of J. than in that of J. B. When disodium hydrogen phosphate (Na_2HPO_4) is added to the blood of J., to the extent of 0.003 gram per c.c., the inclination of the line is changed, as shown in the dotted line *O-O*; while if 0.003 gram of sodium phosphate per c.c., and 0.0008 gram of sodium bicarbonate be added, the points marked *J. J.* are obtained, which are nearly on the curve of the person (J. B.) with normal respiratory phenomena.

In conclusion: (1) An altered state of the blood may account for the unexplained breathlessness in some cases of irritable heart. (2) "Nerve center instability or irritability" had often served as a cloak for our ignorance when disordered metabolism was the working factor. We are now reminded to correct our customary reading of the individual tale of physical inefficiency as a "poorness of spirit and lack of zeal," by recognizing that there is no more potent restraint to the display of spirit than the early conditions of ill health.

The Therapeutic Administration of Oxygen. A radical improvement in our clinical method is urged by Prof. J. S. Haldane in the *British Medical Journal*, February 10, 1917. The prevailing routine is answerable for our uncertainty as to the special clinical indications and the suitable dose in each case, and as to the serious risks involved. A reliable method can only be based upon the *essential physiological data*. The medulla's delicate regulation of the respiratory function is bound up with the practically constant level (5.6 per cent.) maintained by the percentage of CO_2 in the alveolar air: this ensures its like constancy in the arterial blood supplied to the respiratory center, and in the alkalinity or H-ion concentration. So finely is that balance adjusted that a mere rise of 0.2 per cent. of CO_2 doubles the amount of air inspired into the lung; and a fall of 0.2 per cent. produces apnea, "even if the arterial blood be so deficient in oxygen as to cause cyanosis." Nay, animals whose blood has been more largely deprived of CO_2 by forcible artificial respiration cease to breathe and soon die from want of oxygen "without drawing a single breath."

Although the "alveolar" CO_2 percentage is the main regulator, *only a sudden reduction in the O-content of the "external" air supply causes at once a great increase in the breathing.* But this quickly subsides, in

spite of a steadily increasing O-want in the blood. A gradual reduction in the oxygen supply of the blood (as in CO poisoning, or in a slow aviation ascent) causes "no manifest hyperpnea" as a preliminary warning of the threatening paralysis of movement and of consciousness from O-starvation. It is a dangerous mistake, still prevalent, to look to the "breathing" as a reliable index of the adequacy or inadequacy of blood's O-supply. It should also be recognized that any hyperpnea which is kept up persistently must be due, not to O-want, but to some other cause.

Cheyne-Stokes breathing best illustrates the great contrast between the mode of action of O and CO₂; CO₂, as the stimulus of the medulla; O, as its sensitizer. O-want which eventually paralyzes the sensitiveness to CO₂ immediately raises it, and sets up an urgent need to breathe. This is relieved by the hyperpnea, which quickly increases the partial pressure of O in the alveolus and in the blood supplied to the medulla, and thereby again reduces to a minimum the depth of breathing. That hypersensitiveness and the Cheyne-Stokes rhythm are also easily produced in an atmosphere, such as that of the altitude which contains little oxygen; these are likewise easily relieved by an artificial O supply. In the "clinical" case the relief is spontaneously due to the free escape of CO₂ from the blood into the alveolus. The hyperpnea, by clearing the alveolus of the excess of CO₂ also clears it out of the blood. But if, as in some cases of angina pectoris, that escape should be interfered with, the hyperpnea will continue, or constantly recur, "in spite of O administration."

At this stage it should be mentioned that the vagus nerves are specially concerned with the regulation of the "frequency" of breathing; but that we can also vary it at will. "Hyperpnea" (in the sense of an increase in the volume of air breathed per minute) is not dependent upon mere frequency. For instance, we might raise the frequency of our breaths from 3 to 60 per minute, without materially increasing the lung ventilation, or altering the composition of the alveolar air. A man at rest usually breathes about 7 liters of air a minute

The normal O-percentage in the alveolus is about 14 per cent., viz., 7 per cent. less than in the external air. Human arterial blood carries about 18.1 c.c. of available O per 100 c.c. of blood. Of this, about 17.75 c.c. are "combined" with the hemoglobin, and 0.35 c.c. are in "simple solution." In passing around the circulation during rest, this blood loses only about 4.5 c.c. of oxygen. In poisoning by CO and similar respiratory poisons, death occurs when about 80 per cent. of the hemoglobin is disabled. If the patient is still alive, there will, therefore, still be 20 per cent. of his hemoglobin available. By administering "pure" O we can at once increase the amount held in simple solution to about 2.5 c.c. This promptly averts any further danger from want of oxygen. In CO poisoning O will rapidly drive out the CO from the hemoglobin so that after fifteen to twenty minutes the continuous O-administration may be discontinued. In poisoning by nitrites, etc., there is also a fairly rapid return of the blood toward the normal, consequent on the gradual elimination or destruction of the poison. Experiments on animals have

shown quite clearly that O actually does avert death in the cases just considered.

It was shown by Paul Bert that O at a pressure of about 3 atmospheres is capable of producing convulsions and rapid death. But Lorrain Smith found that, apart altogether from this action on the nervous system, pure O at "high pressure" produces pneumonia pretty rapidly; and that, even at "ordinary atmospheric pressure," it acts slowly upon the lungs, ultimately producing fatal pneumonia in animals after several days, in some even within four days by a supply of a mixture containing only 80 per cent. of oxygen. Therefore, let us keep the O percentage as low as possible during long administrations; and always know roughly what percentage is being breathed.

O-want and cyanosis call for a few remarks. The normal lungs and circulatory organs are adapted to meet about ten times the requirements during rest. Hence in bed a very small proportion of normal lung meet respiratory and circulatory requirements, provided there is but little circulation through limbs which are unused. Again in pneumonia, with very little blood passing through the consolidated areas, there is commonly no cyanosis: Enough passes through the others, when at absolute rest. In other lung affections, when, in spite of air entering the whole of the lungs freely, cyanosis does occur, it can only be that the O-entry into the blood through the alveolar walls is impeded by exudation and thickening of the walls, although for the CO₂ there may be no serious impediment to the passage outward. CO₂, being about twenty-five times as soluble in water as O, passes through far more easily than O with a given difference of partial pressure. Moreover, the comparatively slight increase in breathing which vastly increases the small difference in diffusion pressure on which the passage of CO₂ outward depends, will produce only a slight proportional increase in the diffusion pressure which drives the O inward. Hence we may have cyanosis, and other formidable effects from O-want, *without any marked hyperpnea*. The "gray" look of the patient's face will be a good index of this; and there will probably be no increase in venous blood-pressure such as accompanies full blue cyanosis.

When there is *cyanosis* (whether of the deep purple, or of the gray type) due to *hindered passage of O* through the alveolar walls, this can be combated by raising the O-percentage in the alveolar air and so increasing the *diffusion pressure*. By raising the percentage of oxygen in the inspired air to 35, we raise the alveolar O-percentage to 28, much more than doubling the effective diffusion pressure, since the O-pressure in the venous blood passing to the lungs will probably be at least 4 per cent. It will probably, therefore, require "only a moderate increase" in the O-percentage of the inspired air *to remove the cyanosis*. Even in ordinary cases of croupous pneumonia the alveolar O-pressure may be a matter of decisive importance. For instance acute pneumonias do very badly at *high altitudes*: at Cripple Creek (altitude about 10,000 feet) in the Rocky Mountains this is so well recognized that all cases of pneumonia are put in the train and sent down to prairie level.

If the degree of O-want is "slight and only temporary" the immediate

symptoms are trifling, and may hardly be noticed except on muscular exertion. But if the exposure is continued alarming, effects are produced, such as severe headache, nausea, and extreme depression. These are seen typically in "mountain sickness," after a rather long exposure to a comparatively low percentage of CO; and they form part of the clinical picture of many cardiopulmonary affections. In cases of CO poisoning it is usually after the exposure that the symptoms develop; and in mountain sickness several hours' exposure are usually needed.

Great hyperpnea accompanied by O-want is characterized by marked rise in pulse-rate, palpitation, great rise in "arterial," and, what is still more remarkable, a simultaneous great rise in "venous" blood-pressure. The latter phenomenon is indicated by distention of the lips, face, tongue, etc., with blue venous blood, distention of superficial veins in the neck and chest, and the other signs of "acute" cyanosis. The high venous blood-pressure is very apt to lead to overdilatation of the right side of the heart and consequent paralysis of the heart and death. For this reason, free venesection may be of the greatest service in acute cyanosis. If the washing out of CO₂ in the lungs "is not interfered with," acute cyanosis and hyperpnea do not occur at all; or they are only temporary. But the other effects of O-want then rise into prominence. The lips become of a leaden or gray, rather than blue, color, since they are not distended with blood. Sensibility, mental control, and memory begin to fail rapidly. At a further state of O-want the legs are usually first paralyzed, then the arms, and later the head and neck. The senses also go one by one, hearing being the last. In CO poisoning, if loss of consciousness from O-want has continued for some hours, ultimate recovery of the central nervous system is very doubtful; and the heart, kidneys, and other organs may also suffer badly (*e. g.*, cardiac dilatation and valvular incompetence, lasting for weeks). "A fatal mistake" is not to grasp the serious, widespread, and lasting effects caused by deficiency of oxygen. Even when the O-want is removed, these effects remain. This is very strikingly seen in the rescued from CO poisoning. The CO is very rapidly washed out of the blood; but the man may still be in a unconscious, dying condition, with his blood quite free from the CO which caused the O-want. *The damage* done by O-want depends partly on its degree, but still more on its duration.

In threatening failure of the circulation from valvular disease the cyanosis may clear up "at once" on O-inhalation. This could hardly be attributed to the slight increase of O going into simple physical solution in the arterial blood. More probably, owing to back pressure, consequent exudation, etc., there is in the lungs some hindrance to the diffusion inward of oxygen, which an increased O-pressure may overcome. Cyanosis always indicates that O-inhalation should be considered.

The Regulated Inhalation of Oxygen. It is well not to add oxygen too rapidly to the inspired air in cases of cyanosis, as this might produce tumultuous heart action, or irregular breathing with pain or discomfort, and perhaps rouse the respiratory center to reaction against accumulated CO₂. The methods still in use are crude and wasteful, and without any efficient control over the O-percentage administered. The simple

apparatus to be described remedies these defects and provides for the prolonged administration of the minimum of O sufficient for the purpose aimed at.

An ordinary 20-foot O-cylinder is fitted with a pressure gauge and adjustable governor of the type employed in mine rescue apparatus. By means of the governor, the delivery can be varied from nothing to 10 liters a minute. The oxygen is delivered into a small rubber bag of about 2 liters' capacity. From the bag a flexible tube (about $\frac{5}{8}$ inch) passes. This tube at its origin from the bag, is provided with a non-return mica valve; and its last proximal portion is of light, perfectly flexible corrugated rubber, of the kind introduced by Fleuss for the mine-rescue apparatus. The face-piece over mouth and nose is of the ordinary type, except that it leaves a minimum of dead space, and can be kept in position by an elastic strap. Besides the O-inlet, it has inlet and outlet valves for the patient to breathe air quite freely if no oxygen is turned on. Some air also leaks in and out around the face-piece which does not need to be tightly applied. When turned on, the O accumulates in the bag during expiration which by causing slight pressure in



FIG. 2

the face-piece closes the non-return valve, thus preventing the issue of O from the bag and also the entry of expired air into it. During inspiration the bag is emptied, the O passing into the lungs. If only a little gas is turned on the patient will be breathing mostly air. But more and more may be turned on, till nothing but pure O is being inspired; the bag does not then completely collapse till the very end of inspiration. No gas being wasted, an enormous economy results; and a prolonged administration becomes practicable. Where a prolonged inhalation seems desirable, the minimum required to remove the cyanosis is ascertained by observation, and the governor is adjusted to yield it. That minimum may be anything from 1 to 3 liters per minute, the quantity depending on the weight and age of the patient, etc. If hyperpnea due to CO_2 is present, a larger quantity will be needed to reach a given O percentage.

The *probable risks* of prolonged administration of pure oxygen must be borne in mind, and if necessary balanced against the risks of allowing the O-want to continue. No fixed rule can be given. The proper course to pursue must be determined by the physician after careful observation of the patient, and in the light of experience and knowledge.

Many points with regard to the utility of O administration are still obscure, owing to the haphazard methods hitherto used clinically. The apparatus is made by Messrs. Siebe, Gorman & Co., Westminster Bridge Road, London, S. E. A simple resistance meter can also be supplied for rapidly checking the indications of the governor on the cylinder.

LOCAL OZONE THERAPY has been tried successfully by several surgeons during the war. J. Jeffrey reports in the *British Medical Journal*, Aug. 26, 1916, rapid antiseptic results not only in wounds but in suppurating cavities such as the nasal sinuses. He uses a Eustachian catheter to conduct the supply into every recess. The nascent ozone is prepared by passing the O from a cylinder through a small glass ozonifier. Major George Stoker describes in the *Lancet* for October 21 his satisfactory experience in 21 cases. The local treatment of the surface of the cavities and sinuses is applied for a maximum of fifteen minutes or until it coats them with a glaze of oxidized serum, once daily. A dressing of dry gauze is used and the parts are washed twice daily with boiled water. At first there is an increased flow of pus; this is soon replaced by serum, which later is slightly pink. The edges of open wounds are easily cleared of their parchment-like film by a hot compress. Ozone is germicidal, a strong stimulant for the local circulation and for the formation of oxyhemoglobin. By rapidly destroying necrosed material and unhealthy granulations, it discloses the presence of dead bones, of foreign deposits, facilitates treatment and hastens recovery. In a further communication (May 26, 1917) on the "Surgical Uses of Ozone" Stoker brings up to 79 the list of the cases treated (and healed with few exceptions), and furnishes instructions for carrying out his method.

ARTIFICIAL OXYGEN EMPHYSEMA FOR THE TREATMENT OF LOCAL EDEMA. The subcutaneous injection of oxygen was originally employed as a peripheral supply for the general circulation when a disabled pulmonary ventilation failed to arterialize the blood. The resulting interstitial emphysema, an inevitable means to that end, though it proved harmless with due precautions against any entry of the gas into the veins, was regarded as a necessary evil, or, at any rate, as an inconvenience inherent to the method. The latest purpose to which the latter has been turned is not a general, but a local, one; namely in "trench feet," for the rapid relief of the edema and to ward off its most formidable consequence, threatening gangrene. The results obtained by Capt. H. Oswald Smith, and reported by him in the *British Medical Journal*, for April 21, 1917, were strikingly successful. But, in addition, they are singularly instructive. They bid fair to open up for the principle of subcutaneous inflation a wide range of utility in the treatment of severe edemas in general. They demonstrate the beneficent combination of two distinct influences: The biochemical influence of the local arterialization of the stagnant venous blood; and the yet more important mechanical influence of the relaxation of the tensely water-logged interstitial tissue by the artificial emphysema which, in spite of its recognized harmlessness, we had not hitherto suspected of being capable of any curative action.

Smith describes four stages of trench feet: (1) *Neuritic*, producing acute pain, and preventing the patient walking or sleeping. There is no swelling or discoloration of the foot. (2) *Edematous*, without discoloration, but with acute pain produced by the pressure on nerve endings. (3) *Edematous*, with blisters, and varying discoloration of the skin short of gangrene. (4) *Gangrenous*, partial or circumscribed, with edema and blisters, and reddening of the skin involving the lower leg. He has employed subcutaneous injections of oxygen in Classes 2, 3, and 4.

The technic is as follows: In all cases, antitetanic serum should be given under the skin in the arm or pectoral region; the dose should be 500 U. S. A. units. A suitable Woulfe bottle, $\frac{1}{3}$ charged with a saturated solution of sodium carbonate is required to wash the gas delivered from the cylinder. The salvarsan needle is inserted midway between the heel and external malleolus. The oxygen is allowed to enter "slowly" until the foot is filled up. The needle is then withdrawn, and inserted midway between the internal malleolus and the heel; and, if the toes are black and cold, in the midline at the base of the toes. If the part is almost gangrenous, injection into the deeper tissues is of advantage.

"The treatment is based on the conclusion that trench foot is akin to Raynaud's disease." The edema produces stasis in the veins of the foot. The venous blood, if oxygenated, will help to keep the tissues alive until the serum can be drained away. The oxygen helps to drive out the serum slowly but steadily through the puncture holes. Mere puncturing has been found useless for relieving the edema. But by ballooning up the subcutaneous tissue, the oxygen relieves the pressure on the bloodvessels and lymphatics. When the oxygen is absorbed and the serum is drained away, circulation is quickly restored to the limb. There is marked relief of pain at once. The cyanosis changes to pink. Where blackened areas exist, a white line makes its appearance, indicating what would ultimately be the line of demarcation of gangrene. Healthy granulations start from this white line after injections of oxygen. The destruction of parts is greatly lessened, and is often confined to the tips of the toes. In many severe cases, recovery of the whole foot has taken place, some with the loss of a single digit only. Two amputations were necessary to save life. In both, the other foot made splendid recovery. An important point is to drain all the blisters by sterilized thread passed through, and the ends cut short; leaving the dead skin *in situ* as a protective, unless pus be present. Lint wrung out in 1 per cent. solution of picric acid is applied to the part and renewed every day. No cotton-wool should be employed.

At the end of the second day, tingling sensations are complained of. A second injection may be given in the severe cases which are semi-gangrenous and where the edema still persists. One injection is usually found to be sufficient, but picric acid should be used once or twice a day to keep the part dry and sweet. The effect of the oxygen on the deeper layers of the true skin is notable; a rich velvet color persists for several days.

Smith advocates this conservative treatment in all cases of trench feet unless "gas gangrene" should be present, or grave toxemia. Repair is slow but sure, and many hopeless-looking cases have recovered with useful limbs and small loss of structure. In one case, fatal gas gangrene coincided with trench feet of the severest type. The left foot responded to the treatment, and the threatened gangrene in both feet disappeared, but the right foot never cleared up. *Postmortem* examination revealed extensive gas gangrene of liver and spleen.

The length of time for repair and recovery of the part is long in the semigangrenous or gangrenous cases. The granulation tissue is often indolent, with the epithelial margin heaped up. Here, again, oxygen has been found to stimulate epithelial growth, a hypodermic needle being utilized in place of the salvarsan needle.

These surprising results, obtained under the worst conditions we could conceive for testing the safety and the efficiency of any method, reveal to us an agency the healing capabilities of which we had not suspected and the full scope of which we cannot yet foretell. In the first place they are singularly encouraging as demonstrating the absence of any detrimental by-effects which might have deterred us from any further attempts. Surgery will probably supply a choice of material suitable for trial. Medical therapeutics may also benefit more largely than we can at present surmise. A wider and more varied use of "hypodermic oxygen," the modern history of which was reviewed editorially in the *British Medical Journal*, 1915, i, 973, may reveal fresh facts of the action of direct oxygen ventilation upon the tissues. In particular, it might lead to a therapeutic utilization of its anesthetic and analgesic influence, which Capt. Smith had not tried in the early "neuritic" stage of trench foot still free from swelling.

SURGICAL SUBCUTANEOUS EMPHYSEMA. Major J. Phillips, in the *British Medical Journal*, March 17, 1917, makes the following suggestion from his former experience in 2 or 3 cases of surgical emphysema due to injury in the neighborhood of the lachrymal sac. "The rapidity with which the surgical emphysema spread all over the face and neck when the patient used a handkerchief was very striking. In every case of emphysema during labor in which the mode of onset is described, the eyelids (usually one eyelid) is first affected, as in Dr. Milne's case. Surely it is easier to assume that the thin mucous lining of the lachrymal sac has 'gone pop' and that air is forced into the tissues by expulsive efforts from the nasopharynx, than that the air has found its way up from the thorax to make itself evident first in the eyelids." In this connection readers might consult, with advantage, Sir Francis Champney's¹ "Experimental Enquiry on Expiratory Cervical Emphysema Occurring during Labor and during Violent Expiratory Efforts." Personally, the reviewer has had his own experience of facial emphysema from rupture of the lachrymal sac, due to a blow from a tennis ball. He believes, however, that, in the absence of any orbital injury, the air in surgical emphysema, and also in spontaneous pneumothorax

¹ Medico-Chirurgical Translations, 1885, lxxviii.

(apart from any pulmonary lesion or disease) escapes into the connective tissue of the posterior mediastinum at the root of the lung from rupture of some overdistended air sacs ill-supported by the thin pleural reflection which passes from the upper lobe on to the surface of the upper bronchus.

Stuttering Relieved by Reversal of Manual Dexterity. A broad question as to the main significance of left-handedness arises out of its frequent association with other defects, which is engaging the attention of Prof. Jordan and other investigators: namely, whether left-handedness is not *per se* a sign of degeneracy coupled with some form of moral obliquity. That is the question proposed by J. Herbert Claiborne in the *New York Medical Journal* for March 31, 1917, and discussed on the basis of two striking observations in stutterers (and also in two instances of "symbol amblyopia"—a condition for which in a previous paper he had suggested "reversal of the dexterity" as a corrective). In his present communication he reports that stuttering associated with left-handedness has been cured in one case by changing the left-handedness into right-handedness "in association with vocal exercises"; and relieved for two or three years in another by simply changing left-handedness into right-handedness "without" accompanying vocal exercises. Moreover, the history of several cases shows that stuttering may be produced during the transition from simple left-handedness to right-handedness, but ceases when the original use of the left hand is resumed. The whole subject at present is indeterminate, but offers a wide field for speculation and experiment which may lead to important results.

Vagitus Uterinus. Those interested in respiratory physiology may be reminded of Telfair's memoir and rich bibliography in the *New York Medical Journal* of October 11, 1913. He believes in that possibility—given rupture of membranes and presence of air *in utero*. Half of the reliable observations were in operative deliveries, as in his own instance. He infers, with Preyor and others, that the initial stimulus to breathe is not placental but cutaneous. The accident is mostly fatal to the child, who usually needs prolonged artificial respiration for resuscitation. Intra-vaginal vagitus is not very rare. On the other hand, Kelvin heard repeated cries during two hours of a natural labor; and the child needed no artificial respiration. In W. L. Dickson's recent case, reported in the *British Medical Journal*, December 2, 1916, the cry was heard by the nurse, and again by himself, before he applied the forceps. The child was born in advanced asphyxia, but soon revived.

PHYSICAL SIGNS AND METHODS.

An Auscultatory Sign Over the Manubrium is described by Louis M. Warfield in the *Journal of the American Medical Association*, October 28, namely, a conversion of the normal vesicular murmur from the pulmonary fringes into bronchial or high-pitched tubular breath sounds by the interposition of any solid mass between the trachea and the upper sternum. Manubrial auscultation has been neglected in the

routine of physical examination and of its teaching. For this there is no excuse. Why not always place the stethoscope first there; before listening below the right or left clavicle; or, better still, we might suggest, and more business-like, "above" the notch and then "below" it, to sample first the tracheal breathing, and thus to test more finely its downward conduction if audible, as a general indication of some retro-manubrial solid encroachment (enlarged thymus, great vessels, glands, or mediastinitis). As a fact, although thoroughly commendable, that preliminary examination is not indispensable; because, owing to the sound conductivity of the manubrium and cartilages, it cannot supply the precise delimitation which is *de rigueur*; and which is obtainable only by percussion or by skiascopy. Our routine percussion, far from being, as he states, "incompetent" to report any solid encroachment between the fringes, has for its indispensable duty in all earnest examinations to map out, "through" the normal fringes, the width of the underlying set of great vessels quite as accurately as it has to map out the heart. That examination reveals not only the presence but the precise anterior measurements of any pathological change. It is to be regretted that that elementary diagnostic facility, originally described many years ago in "cardiac outlines," should not yet have been utilized in the clinical wards sufficiently to bring it to the notice of students for their future use in practice.

The Test for Albuminoid Bodies in Expired Air; and the Telephone. The method described by W. Weichardt and K. Wiener¹ is to blow through a cotton-stoppered tube into a wash-bottle containing 3 c.c. of distilled water. The water is then rapidly evaporated, and chemical tests are applied to the residue. These established the presence of albuminoid bodies in the expired air. The amount averaged 0.000015 mg. for each inspiration during quiet breathing, or a total of 0.05 mg. for twenty-four hours. The proportion during speaking averaged 0.07 mg. for the twenty-four hours. The tests thus showed marked enrichment of the air in telephone cabinets; but also that the air seems to spontaneously cleanse itself. In a telephone cabinet about 2200 liters air were aspirated through a wash-bottle, twelve hours after the testing. The findings after that interval were practically *nil*.

Signs of Death for Field Use. Laborde's traction of the tongue was regarded by him both as a means of resuscitation, and as a test of death when it failed. A. Satal, a French army surgeon, recommends in the *Medical Press*, February 21, 1917, the life-saving practice in the field in all cases; and he also refers to two previously published tests in the apparently dead. Itard's "fluoresceine" subcutaneous injection (2 grains, contained in 10 c.c. of an alkaline solution of 1:5) produces, in the living, a green staining of the conjunctiva and a yellowness of the skin. Ambard and Brissemorel's death test, "the acid reaction" of visceral blood withdrawn by the hypodermic syringe from the liver or spleen, is merely confirmatory; as the acidity is not perceptible with litmus earlier than half an hour, and is not very distinct until two hours, after death.

¹ Berl. klin. Wehnschr., December 4, 1916.

A much simpler device is urged by F. Massana¹ who attributes its origin to Lecha Marzo, of Granada. A piece of blue litmus is introduced under the eyelid. Life is extinct, if this has changed color after a few moments, as an acid reaction of the lachrymal secretion and of the blood is incompatible with it.

The Portable Partial Vacuum Apparatus by Harvey G. Beck,² of Baltimore, combines the essential addition of a pressure gauge with great simplicity in working, as the suction is turned on or off by the foot exercising control over the long floor tube. It serves varied purposes: of diagnosis and treatment for the chest or abdomen; of bleeding or cupping; of blood aspiration, etc.

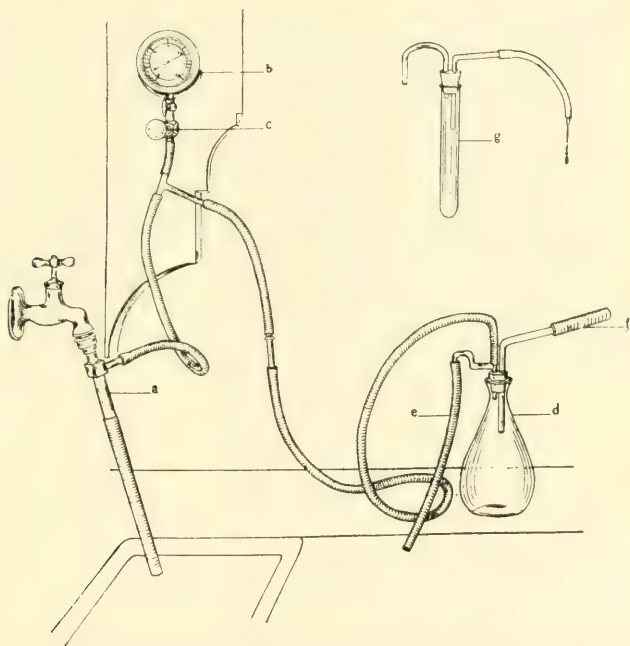


FIG. 3.—Partial vacuum apparatus: *a*, filter pump; *b*, vacuum gage; *c*, vacuum regulator; *d*, wash bottle for collecting stomach contents; *e*, connecting tube with which to cut off the air and release the vacuum by means of the foot; *f*, stomach-tube; *g*, attachment for withdrawing blood for Wassermann test.

Its use is limited only by the indispensable requirement of the vicinity of a tap with continuous high-pressure water supply.

P. Atlee Sheaff's³ Improved Aspirating Apparatus, which he describes as a "hydrostatic hour-glass," is the essence of simplicity. As seen in the sketch, its only objection is the length of the reversible brass tube, closed at both ends. This carries its own charge of water in the upper half, separated from the air in the lower half by a diaphragm through

¹ Rev. di Med. Y. Cir. pract., September 21, 1916.

² Journal American Medical Association, December 2, 1916.

³ Ibid., March 3, 1917.

which a tap allows it to flow during use; the air being given free exit through a lateral orifice immediately below the diaphragm. A vacuum, with negative pressure of 65 mm. of mercury, is thus established at the upper end; and that suction is transmitted through a $\frac{1}{8}$ -inch pet-cock and through rubber tubing to the aspirating bottle, which is suspended by a clip to the side of the tube.

After the operation is over, any remaining water in the upper chamber is allowed to flow into the lower chamber and all cocks are closed. The apparatus is then instantly ready for use again by turning it upside down and repeating the manipulation, after connecting the tubing of the aspirating bottle to the upper pet-cock.

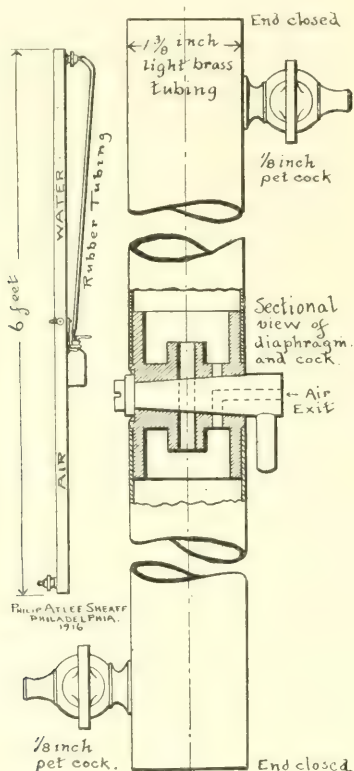


FIG. 4.—Improved apparatus for aspirating gastric contents, etc.

A **Social Outdoor Exerciser**, of great promise for Schools, Sanatoriums, Clubs, etc., is sketched in the *Journal of the American Medical Association* for December 16 by W. R. Heylman. It suggests in the rough an idea well worth elaborating into suitable modifications.

The **Air-bubble Test for Clotting** was submitted to the Académie de Médecine on November 7, 1916, by E. Lenoble as the most precise of all timing methods. His technic is to enclose a little air with the blood in a Hayem's hematimeter. So long as the blood is fluid the minute

bubble moves about freely like that in a spirit level. It is immobilized, and unmoved by slow tilting, the instant coagulation occurs.

A Simple and Reliable Antiseptic Preservative for Putrescible Fluids, and for Hypodermic Solutions is, according to R. Romanelli's statement in the *Policlinico* for January 28, 1917, to introduce a small fragment of gum camphor into the bottle. His specimen of white of egg still shows no change after ten years; neither does a 5 per cent. gelatin solution which he has kept for twelve months. The inference is that the camphor vapor destroys the germs as they enter. Any of it that might be dissolved in the solution before injection would be a negligible and entirely harmless addition to its composition.



FIG. 5

An Efficient and Simple Preservative Method for Large Anatomical Specimens, and also for embalming, is described by N. K. Lisenkoff in the *Russkiy Vrach*, 1916, xv, 48. Large sections of the trunk or limbs can be kept for years loose, on the museum shelves, and constantly available for demonstration; with very little shrinkage, and with partial preservation of color, the muscle tissue remaining pink, etc. They require to be soaked for at least one month in a bath (in which they float, covered with a layer of cotton-wool) containing 1000 parts water, 500 parts glycerin, 500 parts by weight of potassium acetate, and 40 parts of formaldehyde solution—preferably after injecting the vessels with that mixture. Instead of the formaldehyde, he has lately used 2 parts of an alcoholic solution of thymol (1 in 20). After that process, no perceptible evaporation occurs from the specimens when permanently exposed to the air in their receptacles, or out of them. For many years he has derived great assistance from this method in teaching topographical anatomy and operative surgery at the University of Odessa.

PULMONARY TUBERCULOSIS.

Some Medicine Problems of the Present and the Future. Wm. M. Crofton's¹ spacious theme at the Inaugural Meeting of the Medical

¹ Medical Press and Circular, February 28, 1917.

Society of Dublin opens with a reference to the relative numerical order of the mortality—from old age; from tubercle, from heart disease, from bronchitis, from pneumonia, and from cancer¹ which in 1914 claimed nearly as many deaths as pneumonia. Much of all this is now preventable, yet still not prevented. We have always in us microbes ready and capable of resolving us into our elements if our resistance is lowered, *e. g.*, the *Bacillus coli*. Chronic infection and poisoning from the bowel is the common cause of arteriosclerosis and like diseases which produce premature senility. Metchnikoff recommended the establishment in our intestinal tract of microbes which would produce lactic acid. Lane's plan is to cut out the large intestine. The first plan is a "feeble" one, the second "absurd." Much better to increase the patient's immunity by means of vaccine.

THE TUBERCULOSIS MORTALITY, as recently pointed out by Prof. Pearson, is not now showing any rapid fall; it is not falling at the same rate as the general mortality. Our efforts at prevention and cure have been so far futile. While practically all children are sooner or later infected, only few develop the disease; the majority are protected by a normal immunizing mechanism. The only means of stamping out tuberculosis is the preventive inoculation of those who need it. This, Crofton believes, is perfectly safe if properly conducted; and it also enables us to detect the disease at the earliest and most curable stage.

TREATMENT. The basis of treatment is to recognize that the "pulmonary" form is a mixed catarrhal infection, and needs a combination of chemo- with immunotherapy. His method is to administer iodoform intravenously in solution in ether, and a course of autogenous vaccine made from the patient's sputum at the same time, to be followed by a course of tuberculin. Taking all the cases, the number of "apparent cures"—that is, of those who had lost active signs in the lungs, and of those in whose sputum tubercle bacilli were no longer found—was just trebled, and for the first time 5.6 per cent. of advanced cases were apparently cured. In 1912, before the treatment was employed, none were "apparently cured." These methods have apparently cured several acute cases, who remain well after some years; and have also arrested many advanced cases. Moreover, Mr. Algar is helping him to improve the chemotherapy of the disease. Di-iodosalicylic acid seems to be giving improved results; and they are sure that the solution of the tubercle bacillus in benzoylchloride is a better tubercular antigen than any of the other tuberculins used. But, in addition, if we are to win the fight against the disease, we have got to be properly and efficiently organized.

In heart disease, too, can we not do more to prevent the damage, or to reduce it to a minimum? The most common infections are various streptococci in the circulation in acute and chronic rheumatic conditions, scarlet fever, and so on. We cannot yet prevent scarlet fever: but with sera, vaccines, and chemotherapy we can do away with focal

¹ In England and Wales alone some 40,000 annually succumb; and for the first time the mortality has definitely overtaken that from consumption (Fifth Ann. Rep. of Soc. for Prevention and Relief of Cancer).

infections in the heart and kidneys. Salicylates are valuable, but only feebly germicidal. The di-iodosalicylates are much more powerful, especially when given intravenously. Autogenous vaccines, too, should be used. Preceding rheumatic fever there are nearly always foci of infection, especially in the tonsils or gums. If these were treated and cleared up, acute and chronic rheumatism would not occur. Our aim, then, is to prevent heart disease, since structural damage is irreparable.

The acute and chronic lung infections other than tuberculosis beat even this disease as a cause of death. Ipecacuanha and antimony are used as a routine treatment for bronchitis and bronchopneumonia in children in large doses, to make the child vomit and so get rid of the mucus in his tubes. But what if the child does not vomit? Fewer children will die of acute bronchitis if a simple mixture of squills and nitrous ether is used. As a rule their recovery is permanent. If not, vaccines made from the flora of their sputum will rapidly cure them permanently. The same holds good in adults. With our present resources, no catarrh need ever become chronic; although the microbes of acute catarrhs are so numerous that it is not feasible to use prophylactic vaccines. In pneumonia, the pneumococci vary so much in the quality of their toxins that a universally effective serum is not likely to be ever obtained. But an intravital germicide may be found; perhaps in di-iodosalicylic acid, which gives good results with other streptococci, if administered as soon as it is available. Unhappily ethylhydrocuprein, so promising in animal experiments, has not done so well in the human disease.

Cancers commonly develop at a site of some chronic microbic activity. Such local infections are usually curable by "vaccines." Crofton does not believe that cancer is caused by a special microbe. He only suggests that microbes may produce the irritation which sets a cancer going, and supply a suitable environment. Beard's hypothesis that cancer represents an asexual generation has much to recommend it. It is possible, at any rate, that this suitable environment may arise from an abnormal metabolism of foodstuffs produced by intestinal microbes, perhaps from a chronic acidosis, or something of the kind: a reasonable hypothesis to work on.

The Etiology of Tuberculosis and of Endocarditis. The *Journal of Infectious Diseases* for October contains valuable information. L. van Es and A. F. Schalk's research justifies the warning published many years ago by Tucker Wise that song birds may disseminate tuberculosis. Sparrows and chickens fed or inoculated with the mammalian bacillus die in a highly emaciated state. This shows that it thrives in them, and preserves its pathogenic activity over long periods. In his paper on experimental endocarditis, A. T. Henrici concludes, from his inoculations of 225 rabbits with 53 strains of streptococci from various sources, that the results do not support the assumption of a specific streptococcus for rheumatic fever. In rabbits, streptococci of various kinds (both the hemolytic and the less virulent, non-hemolytic) may produce arthritis, myocarditis, endocarditis and myositis with appearances indistinguishable from the Aschoff-Geipel nodules generally considered to be diagnostic of rheumatic myocarditis.

Delayed Tubercle Infection. Prof. Sheridan Delépine's experiments¹ throw light on a most important aspect of the processes of infection, hitherto overlooked. Tubercle bacilli can retain some of their pathogenicity for as long as five hundred days if kept in the dark in milk at a low temperature—below 6° C. But after being kept thus for four and a half years bacilli were no longer pathogenic to guinea-pigs. On the other hand, bacilli of normal virulence, when first heated for a few minutes to 78° C. or 92° C. in order to reduce their pathogenicity, produced but slight local lesions in guinea-pigs at the end of eleven weeks, whereas otherwise local ulceration occurred in a fortnight. But the heated bacilli recovered some of their normal pathogenicity when conveyed—no doubt by the phagocytes—to distant parts of the experimental animals' bodies. That pathogenic revival became more marked as the distance from the seat of inoculation increased; and the lesions of distant organs became practically as extensive as those found in the animals inoculated with the unheated tuberculous milk. The period of latency in these experiments amounted to three or four weeks.

The Diagnosis of the "Prepulmonary" Stage of Tuberculosis. We believe that the popularizing of this unused phrase among the profession, and through the profession among the public, would be a potent agent for good in the campaign against tuberculosis, because emphasizing the importance of a "preventive" suppression of "pulmonary" consumption, which is the main disseminator of the infection. It seems to us that the chief agent of delay in the success of our systematic plan of campaign has been the misconception embodied in the expression "pretubercular stage" as generally understood, and as originally misapplied. Looking back, we perceive that the "anti-tuberculosis" campaign was entirely planned as a frontal attack upon "pulmonary" tuberculosis, which is admittedly responsible for the mortality and for the spread of the infection. In both those particulars pulmonary consumption is the *ne plus ultra* of the evil, undoubtedly. The mistake was to assume that that sinister terminal significance identified it in the individual case as the predominantly responsible factor from the first. That assumption arose from an ignorance of the fundamental fact that the lung is seldom, if ever, attacked *d'emblée*. In short, thought and endeavor were concentrated upon the lung as the *fons et origo mali*. Sanatoria were built for the cure of lung sufferers identifiable by physical signs; while others, not so identified, although suspected of a special liability, were rigidly excluded under the false authority of the label "pretubercular" which was attached to them. The sanatorium, disappointed of its early hopes of curing advanced cases, excluded them also. It finally adopted its present policy of admitting "early cases" only. And the campaign, still under the influence of that misnomer, ultimately proclaimed as its essential working principle "the earliest" possible detection of the signs of "a pulmonary implication." We are still struggling in vain for that almost unattainable earliest diagnosis, with our refined methods of physical examination, and with the added help of the x-rays.

¹ Annales de l'Institut Pasteur, 1916, xxx.

Meanwhile evidence had accrued that the vast majority are infected at an early age. There may be a genuine "pretubercular" stage during which predisposed infants and children might be protected, if only we could recognize that stage. But practically a majority of them have already become tuberculous. They have entered upon their "pre-pulmonary" stage of tuberculosis. Happily, apart from infancy when developments are rapid, and the lungs seem to be often attacked almost *d'emblée*, that stage is usually slow and protracted. This is because the lung, when it has got into full work, far from being the most liable, is one of the most resistant of our organs, partly doubtless because it is of all the most vascular and the most aerated. The practical conclusion from those facts and from this view of them, is that our great campaign should concentrate upon that which it had neglected; not so much upon the detection and treatment of "early pulmonary" tuberculosis as of "prepulmonary" tuberculosis. Last to be attacked, the lung is by far the easiest to insure against a threatened attack, and with least expenditure of time. The radical measure of converting all our State sanatoriums into preventoriums for relatively short periods of residence, would result in an ultimate gain incomparably in excess of the loss which the present generation of pulmonary sufferers might thereby incur.

Concealed Tuberculosis—Its Syndrome. "Concealed" (or shall we say "masked") tuberculosis is a novelty in name rather than idea. According to Poncet, a vast amount of it has been mistaken for rheumatism. But Head, of Minneapolis, in his two papers (the latest, last October in the *American Journal of the Medical Sciences*), leads us much further, in his attempt to identify a "syndrome" for it. Mainly made up of symptoms of a persistent depression of the chief functions—usually in subjects under twenty-five—its bearers are apt to be diagnosed as "neurasthenics." His practical conclusion was to submit all such to a searching course of tests for tuberculosis; and a large number of them reacted positively. He therefore argues that the condition may be regarded as a special type of tuberculosis, distinguished by its slowness or continued failure to attack the lung, although it may affect the hilum of the bronchial glands, or often, too, the mesenteric. As we read it, this is practically a visceral "glandular tuberculosis" as a counterpart to the "peripheral." The latter is self-declared, and is commonly distinguished as the "scrofulous" or "surgical" variety of tuberculosis. It not only likewise spares the lung, but, according to Treves and others, seems actually to protect and to help it when involved. We have heard of and known cases which, when laparotomized, yielded, in the shape of enlarged, caseous, or calcified mesenteric glands, the causal history of sundry mysterious pyrexial attacks during infancy and childhood. This is therefore a helpful reminding term.

Similar ideas are expressed by J. Hollos,¹ who calls for an earlier and more efficient diagnosis and treatment in infancy and childhood. Instead of realizing that all children exposed to continuous or to repeated

¹ Zeitschr. f. Tub., November, 1916.

infection can be regarded as already latently infected, we often ascribe their manifest frailty to some inherited constitutional inferiority, such as the "lymphatic temperament" or Stiller's "universal asthenia." Although curable, they are left untreated.

The Röntgen Rays for Diagnosis have led to great pathological advances in pulmonary tuberculosis, which Judson Daland¹ enumerates. Usually the x-rays reveal more tuberculosis than any physical examination, just as a postmortem generally does. The röntgenologist has a great advantage over the pathologist, in contemplating not the dead, but the living, pathology; and also over the physician, in being able to observe and to compare all its successive stages. On the other hand, while the complete interpretation of the x-ray findings will not be possible before our tuberculosis pathology has been restudied, the present status of the Röntgen diagnosis is most encouraging. Giffin and Sheldon have shown that almost every case of pulmonary tuberculosis with tubercle bacilli in the sputum can be diagnosed by the röntgenologist independently; while in many cases where the sputum contained no tubercle bacilli, and the Röntgen diagnosis was positive, the subsequent history corroborated the Röntgen diagnosis. As it so frequently reveals new or unexpected conditions, no case in the future will be considered as having been thoroughly and completely examined until a Röntgen examination has been made.

Diagnosis by Tuberculin. H. A. Ellis² describes his deep scarification method of graduated inoculations with P. T. O. and Koch's O. T. (in dilutions of $\frac{1}{10000}$, $\frac{1}{1000}$, $\frac{1}{500}$, $\frac{1}{100}$, and $\frac{1}{10}$, or in full strength), the papillary layer being, as he has shown, the most reactive in infected subjects. The nature and intensity of the reactions give a reliable estimate of the stage and degree of the infection, rather than of the extent of its spread; for this, clinical examination has to supply the data for a correct interpretation. Thus a uniformly negative result signifies either complete indemnity, or a complete failure of resistance from advanced disease; an isolated reaction to the two highest potencies, either a fatal prognosis, or a "slight" infection; while a doubtful reaction to the third also, suggests some activity. Most of the active adult cases, as well as the glandular cases in children, react to the first four strengths. Patients reacting, in addition, to the fifth and sixth dilutions are "hypersensitive." Their balance between infection and resistance is precarious and needs specially careful treatment.

THE INOCULATION TEST THROUGH GUINEA-PIGS is greatly accelerated, thanks to the discovery by J. J. Morton, of Boston, that their resistance is much reduced by a single massive x-ray exposure. In renal tuberculosis, for instance, the diagnosis is made in eight to ten days instead of claiming five to seven weeks.

INFINITESIMAL TUBERCULIN INJECTIONS AS A TEST AND A CURE. J. J. Viton³ describes the principle and the working of his "diagnostic therapy" which he has practised with remarkable success. Discarding the local tests, he watches the clinical results of minimal injections

¹ New York Med. Jour., February 3, 1917.

² Lancet, October 7, 1916,

³ Semana méd., 1916, xxiii, 48.

incapable of any focal reactions and of any detrimental effects, gradually increased on repetition at intervals of a few days. Genuine improvement, often very striking, establishes the diagnosis of tuberculosis in doubtful cases, and decides the continuance of a systematic course. He begins his injections with $\frac{1}{20}$ c.c. of "a dilution of 1 c.c. of a ten-millionth tuberculin solution in 4.5 c.c. of sterilized water," with a little addition from a 0.25 per cent. solution of phenol.

Shall We Get Rid of Tuberculosis at Last? Richard Cole Newton¹ is optimistic. He declares his belief in a "tuberculin renaissance," eighty years after the initial "tuberculin delirium," on the lines advocated by Bonime.² In view of the ascertained extreme prevalence of the infection in early life, all should be tested for it just as cattle are tested. Those who react should be submitted to systematic progressive injections twice a week, beginning with infinitesimal doses, to establish an immunity during the misnamed "pretuberculous" stage. No need then to interrupt avocations or the mode of life. Adult patients, too, "can keep right on at their work; their families are not deprived of their support; and there is no going away from home to spend long, desolate hours in a sanatorium."

The Significance of Apical Pleuritis in the Diagnosis. E. Sergent's³ discussion serves a good purpose in reminding us that the pathological as well as the clinical history of the old indurated, pigmented, adherent apex scar, so familiar to the obductionist as the obsolete and solitary witness to some early, latent, and self-curing tuberculous pulmonary onslaught, has yet to be written. Passing over his account of our improved modern, x-ray-aided, physical signs, and mentioning only his description of a frequent unilateral pupillary dilatation or contraction under the influence of sympathetic irritation or paralysis, and of a typical bean-shaped supraclavicular glandular node usually small and hard, but larger and softer during the active pleuritic stage—we note his conclusion, chiefly based upon that extrapulmonary glandular reaction, that this points to an originally pleuritic rather than to a pulmonary attack. This again reopens the question, which has from time to time been proposed, whether glandular and pleural induration might not be the terminus of a tubercular trail down the cervical glands from a tonsillar or faucial infection during infancy or childhood.

As regards the main pathological problem, whether the pleura or the bronchus is originally responsible for the scarring, it might repay investigation to study more systematically the "intrapulmonary morphology" of the scars, which had been merely sketched in my⁴ Goulstonian Lectures on "Pulmonary Cavities, Their Origin, Growth, and Repair." This would probably confirm the observation that much of the apparently pulmonary scarring is in reality nothing more than a folding-in, or "involution" as I termed it, of the thickened, but unbroken, pleura into the intact spongy tissue, as a result of its steady reëxpansion under stress of exertional pulmonary activity. Quite

¹ New York Medical Journal, November 11, 1916.

² Ibid., April 15, and May 13, 1917.

³ Presse méd., August 24, 1916.

⁴ Lancet, and British Medical Journal, 1882, i.

another type is that of the pleural involution of repair, which is likewise centripetal, though, not by passive infolding, but by the central pull upon it of a bronchopulmonary fibrosis of healing. Instead of being relatively superficial and entirely surrounded by healthy spongy tissue, it sinks into the depth, enclosing often a nodule of calcified or dried caseum, and ultimately fuses with the peribronchitic fibrous thickening perhaps clearly traceable to some indurated pigmented glands at the hilum. In these cases it is manifest that the lung had been diseased. But they do not always tell their own tale as to the route followed by their bacillus, whether from the hilum or the pleura.

Some Unusual Causes of Hemoptysis are noted by Arthur Latham and F. de Havilland Hall.¹ Latham mentions two guiding principles in diagnosis: (1) This symptom may occur in practically every disease of the lungs or upper air passages; though it need not lead to any organic consequences, and may not have any more significance than a nose bleeding. (2) When no other cause can be demonstrated, it is due in a very large majority to early consumption. It is not uncommon for older people with atheromatous changes to have repeated attacks of hemoptysis; but these are rarely of much importance. Similarly, it is not uncommon for people who have recovered from pulmonary tuberculosis to have attacks of hemoptysis which are unassociated with any evidence of a renewal of the activity of the tuberculous infection. Again, hemoptysis due to "vicarious menstruation" certainly occurs in a few instances.

Though convinced that hemoptysis may occur from precisely the same causes as epistaxis, he says that we should be sure of our ground. *In the absence of any fever*, and to a less extent in the absence of any physical signs of disease, we can exclude early tuberculosis; and if the hemoptysis is a recurrent symptom, and is never associated with fever, we may feel still more confident.

In 3 cases a mistaken diagnosis and a long and costly treatment for tuberculosis had been based upon a recurrent bleeding simply due to spongy gums. In 10 or 12 doubtful cases with ill-defined physical signs and no tubercle bacilli (except 1 as a terminal development) in streptococci were present in the sputum, but vaccines proved ineffectual. Pulmonary syphilis may be complicated with hemorrhage and overlooked, as in three officers invalided for tuberculosis who were successfully treated after yielding a positive Wassermann reaction. A localized pneumothorax limited by adhesions is apt to occur in patients afflicted with a violent cough and may remain unrecognized until submitted to the x-rays; 6 such cases were thus identified during the last three years. In 1 of them a fatal hemoptysis led to the post-mortem identification of a limited pneumothorax near the angle of the right scapula. Again, in rare instances, a latent aortic aneurysm may produce a leakage into a bronchus or into the trachea, and may not be diagnosable except by the x-rays. Finally, in those who have resided in China the bronchial fluke, there prevalent, should be thought of as possibly responsible for a recurrent hemoptysis not otherwise explained.

¹ Medical Press, February 14 and March 14, 1917.

de Havilland Hall calls attention to his series of cases published in the *Lancet*, in which hemoptysis was due to "high tension." He also dwells upon its frequency in bronchiectasis. He further puts on record the rare instance of a man, aged thirty-seven years, in whom, as a sequel to a lingering attack of influenza, he had diagnosed incipient tubercle, although the bacillus could not be found. Eventually, the *Bacillus coli* was identified in the sputum. He immediately began to improve under vaccine treatment, and completely recovered.

"The Important Factor in Dealing with Tuberculosis." The views of George T. Palmer are presented to us by the *Journal of the American Medical Association* in its "Miscellany" columns for October 28. The gist of his article—important indeed—is as follows: "If the mental, the human side of tuberculosis, could be effectively presented to our learned deliberative bodies of medical men, it would go further toward obtaining early diagnosis and accurate treatment than all the purely scientific lore we now possess." The cases which he narrates fully bear out his conclusions, which we slightly condense: (1) The most important factors are the mental attitude of many laymen and the moral and mental attitude of many physicians toward the disease. (2) There is a tendency to make self-diagnoses and to deny a complicating diagnosis on the part of laymen otherwise ordinarily intelligent. (3) Aside from the difficulty of diagnosis, there is a tendency on the part of many physicians, wholly inexcusable, (a) to make examinations superficial, hasty and useless; (b) to make negative diagnoses based on such wholly inadequate examinations; (c) to make false or deceptive and obviously absurd diagnoses—"weak lungs," "threatened lung trouble," etc., for the purpose of lulling the patient to a false sense of security; (d) to concur in the ridiculous self-diagnosis of patients, to retain their friendship or patronage. (4) There is also an astonishing lack of appreciation of the danger from the employment of exercise or tuberculin in those cases in which there is any degree of disease activity. It is possible that more harm is done by the use of tuberculin in the wrong class, than there is good from its use in the right class of cases. It is likely that more harm is being done by exercise than there is good accomplished by open-air light.

Many suggestions might be added to this chapter on mentality. The following may suffice. Let us fully realize both the immense responsibility and the great difficulty of a sufficiently early diagnosis. In any doubt the only safe line is that of "prevention." Aseptic air and healthy exercise are a sure preventive. For treatment, let us discard the fallacy that mere "open air" suffices in all cases for the cure. Its efficacy is in the proper breathing of it. But there is much else of great use which is neglected under that erroneous assumption. Let us act up to our belief that pulmonary tuberculosis is easily curable; but only at the earliest stage. Let us make it our duty and our business to cure it then. Each case that is not then arrested convicts us of not having used all the weapons which were available.

Treatment. The ban upon any form of treatment other than open-air, hygiene, and tuberculin, which has paralyzed therapeutic endeavor

for thirty years, will be more and more regretted as we begin to realize the value of so much we had neglected. The discovery of the *Spirocheta pallida* has happily not resulted in the shelving of our good old remedies for syphilis, mercury and iodide of potassium; it has only stimulated our search for some more potent chemotherapy. Cod-liver oil was the only agent reputed "beneficial," and not then ruled out: but its object lesson was ignored, that much more active medicines might be found—if looked for. Medication is not, however, the only method worth trying. "Lung" tuberculosis differs from all other varieties in the importance of the mechanical pulmonary factors. Little has hitherto been tried in the line of respiratory mechanics. The efficiency of the heart, and the quality of the blood are known to be fundamental to the cure. What have we done toward promoting them? One of the most trusted remedies for scrofulous affections in olden times was the seton. Might this not contain a principle worth investigating in the light of modern knowledge of phagocytosis and of the other functions of the blood? Dietetic experiments have been tried; but on lines hardly consistent with any sound physiology. Meanwhile no systematic advance has been made in our dietetic treatment, although in all chronic microbic affections the character of the nutrient juices has a powerful influence. New ideas and new methods are everywhere cropping up day by day, from which useful suggestions might arise in many thoughtful minds, if only sufficiently intent upon the business of curing consumption instead of automatically delegating that responsibility to the routine of the sanatorium.

THE TUBERCULOSIS PROBLEM. The *Lancet* (in an editorial, 1917, i, 386) refers to its having expressed seven years ago the same view as T. D. Lister, in his recent address that the present campaign is wrongly based. Dr. Maxwell Williamson, of Edinburgh, has also recently stated that the whole method of treatment should be reversed: the money at present spent on sanatoriums should be devoted to rehousing. Lister deplores the supplanting of the general practitioner by the tuberculosis officer. Town-dwellers are becoming immunized. He would trust their treatment entirely to the hands of the general practitioners at properly equipped out-patient institutions for all classes of disease as well as for tuberculosis. But prevention needs central administrative measures. Preventive action should be taken in any area where the deaths or notifications had exceeded a figure to be known as "the administrative index."

THE ANNUAL REPORTS OF TUBERCULOSIS SANATORIUMS. The same tale is told in the *British Medical Journal's* editorial of February 10, 1917: "Unless treatment can be applied at the outset, it is very doubtful whether the lasting benefits obtained are in any way commensurate with the cost of obtaining them." "The admission of any but incipient cases into sanatoriums should be sternly discouraged. Sentiment must give way to national needs." The article deals mainly with the reports from Glasgow and from Hertfordshire. The latter describes a satisfactory coöperation between 5 dispensaries associated with the County Nursing Association, and 9 visiting stations. After-care com-

mittees are doing good work; and segregation has been most practically secured by the removal of patients to houses where they can be treated on hospital lines. The preventive measures adopted are also well planned, and are worthy of imitation by any less enterprising local authorities.

TRADITIONAL FALLACIES ABOUT TUBERCULOSIS. A perusal of Maurice Fishberg's¹ important paper will give the reader much thought. Much confusion is due to lack of distinction between "infection" and "disease;" and to the erroneous belief in the possibility of "reinfection." Fallacies in prophylaxis have led to great hopes and disappointments; but some of them too to actual detriment to individuals and to the community. The fallacy of heredity has not yet been completely uprooted. As regards diagnosis, it is a delusion to believe that promptness in the recognition and treatment of tuberculosis will eradicate the disease. Another fallacy is to trust to diagnosis by physical signs in the chest; instead of studying the constitutional signs of early phthisis. Tuberculosis in children is a difficult subject in which we are gradually discovering the error of some of our earlier views. In relation to prognosis, special mention is made of the evil significance attached to pulmonary excavation, often undeservedly. Our therapeutic fallacies are legion. Fishberg warns us against the arch fallacy of testing remedies for tuberculosis by the statistical method.

W. Stapley, M.D., as well as veterinary surgeon, writing to the *British Medical Journal*, April 14, 1917, from Cambridge, New Zealand, states strong opinions, based upon facts, which are not favorable to sanatoriums or to tuberculin. There can be no such thing, in the biological sense, as "hereditary" tuberculosis, or "a cross between the human organism and the bacillus;" but immunity *is* strongly transmitted by heredity. Fresh air does not cure tuberculosis. It is not an uncommon thing in New Zealand for cattle that have never been within four walls to be tuberculous. If fresh air and sunshine cure tuberculosis, it is a remarkable fact that this disease has exterminated the aboriginal Tasmanian. The sanatorium in this district, rightly or wrongly, will not have tuberculin within its boundaries; it cures by the aid of pure air and much wind, rest and exercises measured by the beating of a piece of metal. As all these ingredients are to be had in New Zealand without price, an excuse has to be found for the cost of sanatorium treatment, and discipline is added to make the necessary apology. Personally, I know that tuberculin and army discipline have converted much latent tuberculosis into active, widespread disease.

THE INCOMPLETE TREATMENT; AND THE UNCOMPLETED CURE OF CONSUMPTION. The first implies the second. *Nimiâ diligentia*, we had hurried to systematize our practical measures before we had developed any efficient therapy: and a systematic routine has stifled the spirit of individual clinical endeavor, and has swept from the fertile field of individual practice into automatic and auto-administered concentrations its material and its opportunities. That "tactical" mistake has slowly been realized, and our policy is being reversed into one of progressive

¹ New York Medical Journal, December 2, 1916.

decentralization into dispensaries for early, and asylums for advanced cases, with pious intentions to complete it with the all-essential preventorium, and with convalescent colonies. This is well expressed in the recent suggestions of F. Rees, under the above heading in the *British Medical Journal*, January 20, 1917: (a) The dispensary for consultation on, and classification of, cases and suspected cases; (b) suitably situated hospitals for the suspected cases, and notification of "a suspected case;" (c) sanatoriums for undoubted cases with any chance of cure; (d) arrangements to ensure that seemingly cured cases do not return to live under conditions likely to cause a recrudescence of the disease; (e) open-air colonies for those cases which appear incurable and are a danger to the uninfected members of the community. All this still leaves uncorrected and unrecognized (for its recognition has hardly ever been voiced, and is never discussed) the initial "strategical" mistake in that campaign. It still leaves the sanatorium as a fluid quantity, "for the chance of a cure;" while in reality its only justification is "for an effective cure;" or, as this is not yet supplied, for its "prompt discovery." Let us clearly perceive that it was bad generalship to stake our resources in money and in administration upon an institutional system which had not yet won for itself any credentials as a cure. It is not too late to restore the sanatorium and its state subvention to their proper uses. The first is an unrelenting study in that ideal school, for the best and the earliest cure; the second is to apply that cure to the largest possible number by rendering it more and more effective and rapid. We are still under the same initial "institutional" obsession, delegating the duty of curing to a system which attempts much less than we might ourselves have attempted. The urgent need is for a radical revision of the fundamental principles of our phthisiotherapy.

SANATORIAL SUCCESSES AND FAILURES. A medical man in active practice who now rides and plays golf, and who left the sanatorium fifteen years ago cured of double pulmonary and of laryngeal tuberculosis, cites his own case in the *British Medical Journal* in support of the efficacy of sanatorial treatment. Instances such as this, of a recovery from extensive disease under hygienic treatment alone, are exceptional. But they occur also "at home." This rather emphasizes the undoubted frequency of sanatorial failures to cure much slighter cases; and the need of adequate artificial assistance to make up for the prevailing absence of an ample constitutional endowment with *vis medicatrix*. This, we can only hope, but we should never trust, may be possessed by our individual "early" patient.

In the same issue, E. E. Prest, of the Ayrshire Sanatorium, avers that, of all organic maladies, tuberculosis is the most amenable to treatment if acknowledged at once. And G. W. Hambleton, of London, another sufferer in early life, states that it ought not to be assumed that there are no effective means of dealing with phthisis, for they do in fact exist, as he can show from the results of their application in over 100 cases in his private practice during the last thirty years.

ON THE USE OF TUBERCULIN IN GENERAL PRACTICE. The contrast between the views set forth in the two latest published works (1916),

that of Sutherland, of London, and that of Maurice Fishberg, of New York, is significant. The former admits that it is a two-edged weapon, but has had for five years good results from a polyvalent mixture of 11 kinds ($\frac{7}{10}$ of this being T. O. A., with a good deal of the bovine P. T. O.). Fishberg's large experience sums up the tuberculin effect as a psychic one, and deprecates its use by the general practitioner. While not detracting from the excellency of institutional treatment, he recommends prolonged assiduous treatment of patients in their own homes. Our conclusion from both opinions is the same, as to the need for a revised and much augmented edition of the stagnant "possibilities" of the approved sanatorial cure.

THE ROLE OF MEDICATION IN THE THOROUGH TREATMENT OF PULMONARY TUBERCULOSIS is clearly indicated by the clinical causal history of the individual affection. Depressed nutrition is the original evil which is at the root of the infection and of its progressive spread. Its local settlement upon the lung is determined by the depression of the cardio-pulmonary function: by an imperfect pulmonary ventilation due to loss of nerve energy, and a languid pulmonary circulation resulting from cardiac denutritive enfeeblement from impoverished blood. Our "grande hygiène," if resorted to in time, is an absolute insurance against any pulmonary trouble. It breaks the vicious circle by working up the strength of the heart and of the respiratory mechanism by progressive exercise, with an abundance of good air and of food. The genuine "hygienic" cure for consumption is only to be found in prevention. The usual sanatorial method aims at its arrest: namely at the earliest onset of the pulmonary implication, the recognized existence of which is the exclusive qualification for admission. That method, based upon the principle of resting the lungs and heart, departs from the "grand hygiène" by systematically neglecting its primary essential. For safety it keeps working within the vicious circle which it dare not attempt to break, as it could have done at the "prepulmonary" stage. It administers the curative open air to the healthy pulmonary districts; but keeps it from the infected ones for fear of spreading the infection. Some substitute is clearly desirable to make up for that conscientious limitation in the active curative treatment; tonic medication is available for this. If we know of any blood-making, nerve stimulating, heart strengthening remedies, they are indicated during that initial resting period. In the measure as exercise is allowed, they will become less and less essential.

The second indication for medication is the continued failure of rest and of tuberculin to arrest the bacillary progress. For a long time we had given up all hopes of finding any effective remedy for the tuberculosis itself. That hope is now reviving, and is stimulating a renewed search, which has already led to the recognition of the value of iodine, and has recently disclosed remarkable curative properties in cyanocuprol, and which bids fair to furnish us eventually with the chemotherapeutic cure we had despaired of discovering. Meanwhile, we have in hand definite medicinal adjuvants to accelerate the slow open-air cure of chronic cases.

CHEMOTHERAPY IN TUBERCULOSIS. Paul A. Lewis, of the Henry Phipps Institute, gave an important lecture on November 25, 1916, before the Harvey Society of New York. Ehrlich's correct definition of the term applies strictly to specific selective affinities of a chemical agent for an organism of disease or its constituents. Chemotherapy was immediately thought of by Koch after his discovery, and subsequently by von Behring and Ehrlich. Substances were found which acted *in vitro* as specific disinfectants; but they failed to reach the living bacillus *in situ* with sufficient destructive or inhibitory potency. Koch's appeal to serotherapy and its long and patient experimental investigation were due to that failure. Chemotherapy is now coming in again for the searching study which it has been so long denied.

The first step was the discovery that some substances are not inactive in infected animals, although neither disinfecting or inhibiting *in vitro*. Others have more recently been found which are active *in vitro*, and whose distribution coefficients in the organism do permit them to reach the foci in effective strength. These are now being tried. The experimental pitfalls from complicating vital factors and from technical intricacies are great; yet not insuperable. A great initial paralyzing fallacy "that the tubercles were impermeably walled off from the circulation" has at last been ruled out by the surprising ease with which they can be actually penetrated by certain vital stains, such as isamine blue, which stains all the outer layers, and trypan red, which penetrates to their very interior. It was found that methylene blue, trypan blue, and many of the azo-dyes are possessed of this power of penetration. Methylene-blue not only penetrates the tubercles well, but is largely reduced in them. The problem then resolved itself into the building up of a large number of substances and combinations which had this penetrating power, beginning with trypan red. The indication was to form penetrating combinations with effective agents. The dye was therefore combined with iodine, the phenols, etc., and these preparations were then tested on infected animals. Iodine was used on account of the long-standing belief among clinicians that it had some special affinity for tubercle bacilli. Phenol, guaiacol, etc., were known to be antiseptic toward the tubercle bacilli. This work had just got well under way when the war broke out and closed the market for the needed dye. Search was therefore necessary for some other parent substance for modification. It was found that Niagara Blue II B. had the advantage of being similar to trypan red chemically. A series of studies was also undertaken to find substances which had specific antiseptic or inhibitory properties against tubercle bacilli. Several hundred substances were formed and tested in this respect, comparing their antiseptic properties against tubercle bacilli with those against staphylococci, pneumococci, and typhoid bacilli. The general results of these investigations showed that the typhoid bacillus was the most resistant of all the organisms to the anilin dyes; that the triphenyl methane group of dyes were least active on the tubercle bacilli; and that the group of azo-dyes was the most highly specific against these organisms. In general, any efforts to increase the inhibitory action of a substance deprived it

largely or entirely of its penetrating power in the living animal. Certain compounds of creosote, however, were produced which seemed to retain both properties in good measure. The testing of these compounds upon infected animals has now only been just begun, and the results so far indicate that the use of creosote compounds influence the infected animals favorably in that they seem to prolong life. But in this respect they are inferior to tuberculin, and not superior to several other chemotherapeutic agents described by others. The present status of the chemotherapy of tuberculosis might be stated to be hopeful for the future, although the experiments thus far carried out could not be described as successful, except as giving direction to the work yet to be done.

CYANOCUPROL INTRAVENOUSLY. Two separate papers are devoted to this new proposition in the *Journal of Experimental Medicine* for August, 1916, by Koga and by Otani. They have both found it effective in surgical and in pulmonary tuberculosis, chiefly in the first and second stage; and believe it may perhaps supplant tuberculin in practice. It is dangerous to inject more than 8.5 c.c. or more often than once in two weeks; and complete rest is necessary. The minimum dose of 10 mg. of the substance should be cautiously increased; and no iodides, tuberculin, guaiacol, etc., should be administered. Koga thinks that the action is primarily upon the tissues and indirectly upon the bacillus. In animals he has had better results than with any other agent. Clinically, the range of its applicability and of its efficacy has yet to be determined.

Sir Leonard Rogers has announced that his intention to investigate the action of gynocardiates on the human tuberculosis bacillus. On the other hand, as suggested to him from India, it might be worth while trying oleum alli on the leprosy bacillus, in view of the favorable accounts which have been given by Vivian Poore, Cavazzani, McDuffie, Minchin, and others, of its curative action in tuberculosis.

THE INFLUENCE OF CALCIUM IN THE ETIOLOGY AND TREATMENT OF TUBERCULOSIS. G. Fisac¹ insists again upon the immunity conferred by habitual contact with lime and plaster. He quotes evidence tending to show that lungs and bones affected with tuberculosis are abnormally poor in lime. He deplores that the practical conclusion contained in those facts is not taught and acted upon. He is convinced that the compounds of calcium are foremost among the agents which can increase the resistance of tissues, and should be given a more prominent place in our therapeutics against tuberculosis.

On the other hand, the results of the latest investigation by Halverson, Mohler, and Bergeim at the Jefferson Medical College published in the *Journal of American Medical Association*, May 5, 1917 are to the effect: (1) That "no marked deviations" from the normal are observed in the Ca-content of the serum of patients in various stages; although improving patients showed on the average slightly higher values than the unimproved; and (2) that in no case was the Ca-value increased above normal by the large Ca-supply from a high milk diet. The failure of the

¹ Siglo méd., November 4, 1916.

tuberculous to deposit lime is ascribable not to a blood defect in calcium, but rather to an inability of the cells in the tuberculized area to properly utilize it.

STRYCHNINE AS A TONIC IN PHTHISIS. When the entire pharmacopœia was banned thirty years ago, an exception should have been made for strychnine. Why was it not made, as it cannot injure the lungs? And why has it not been restored as an adjuvant to the slow sanatorial cure? Clearly because the profession has been in ignorance of its value. Why that ignorance, but for the absence of its effective mode of administration? So far as we are aware, the last (and perhaps the first) published instance of its use in curative potent doses was Trousseau's intensive treatment of chorea minor. Many years ago, before being aware of his prior claim, the present writer developed his own treatment which in that respect was practically identical with Trousseau's. The excellent results obtained were contained in a paper which was sent to the *Lancet* but never published, while the treatment still remains without any better substitute. He has also long included strychnine in ordinary doses in his treatment of phthisis in all its stages. Attention can only very briefly be called to the great value of W. Forsyth Milroy's¹ paper describing his success in giving full effect to William Pepper's recommendation of strychnine for pulmonary tuberculosis twenty years ago. His method is to begin with $\frac{1}{30}$ grain four times daily and to add $\frac{1}{30}$ to the daily allowance at the end of each five-day period, until $\frac{8}{30}$ are being given daily; then reducing the increase to $\frac{1}{60}$ until the limit is reached. The maximum dose is indicated by the occurrence of muscular rigidity, most frequently in the posterior muscles of the neck, and next in the muscles of the inferior maxilla, though they sometimes appear first in the anterior muscles of the thigh. Then the dose is reduced only a little, and the muscular rigidity disappears. It is at this dose that the greatest benefit is obtained. One woman weighing about 120 pounds took $\frac{3}{4}$ grain daily for many months. A man weighing 140 pounds took $\frac{5}{6}$ grain daily for a long period; and a woman weighing 110 pounds 1 grain daily for five days with no toxic effect. The results obtained by him and his pupils are sometimes almost beyond belief. He also refers to recent analogous reports from Switzerland and from France in phthisis and in nervous disorders, neurasthenia, etc.

The action, which is primarily upon the nervous system (including the sympathetic), and probably strongest upon the medulla and spinal cord, results in a stimulation of the physiological activity of the entire body. Admitting that cardiac power and blood-pressure may not be directly influenced, the fact remains that the heart's action is influenced favorably in certain conditions. In a doctor with a crippled heart, which became irregular and intermittent, with distressing subjective symptoms whenever overtaxed, a few doses of strychnine restored the action to normal. As regards phthisis, cellular nutrition is an active vital process which is under the direct control of the nervous system. Therefore full doses of strychnine directly promote a new and vigorous cell activity of the whole

¹ New York Medical Journal, November 11, 1916.

body, thus tending to restore the opsonic index. In reference to administration he adds that, though the drug may not be wholly eliminated from the body for as long as eight days, it is mostly gone at the end of twelve hours; therefore the doses must not be too infrequent. It is worth while to mention also that there is no tendency to habit formation; and, that the largest doses may be abruptly broken off with impunity. Further, this method of treatment is not dangerous. A perfectly safe margin exists between the first appearance of muscular spasm and a really poisonous dose.

THE VALUE OF REST AND EXERCISE. Charles L. Minor¹ confirms the main principles which now guide all clinicians. The urgencies of the disease impose absolute rest, with the regretted temporary suspension of all the health values of exercise. His practice of beginning its resumption with mere sitting up in a chair, and next with crocheting for women, and solitaire for men, etc., reminds us that the art we should study is fine gradation, and that we might perhaps go yet further in minimizing the initial muscular exertion, as this might enable us to prescribe it earlier.

PULMONARY REST BY POSTURE. Fishberg quotes Rubel's observation that in rabbits infected intravenously, a previously immobilized lung develops chronic, the other rapidly progressive, lesions. That is the basis adopted by Webb, Forster, and Houck,² of Colorado Springs, in their clinical management. It seems to them rational that patients should lie on the side of the more diseased lung at night, and also as much as possible during the day. During the past year they have applied this principle in a large number of cases, with the additional help of a small, firm pillow under the dependent side, "with encouraging results." What then of Rubel's object lesson in protective immobilization? The question is a very large one. It is fundamental to the rational use of the liege-stuhl, and to the entire technic of the sanatorial cure by rest in recumbency, the avowed purpose of which is not "prevention" but "cure." Those two separate purposes are in reality served most effectively by opposite mechanical agencies. Sanatorial authority is open to the criticism that it has never systematically studied the physiological elements of the clinical problem; but has merely perpetuated a traditional routine in its initial crudity as it emerged wholesale from the laudable theoretical principle of tissue-rest as the foundation of organic cure. That principle clearly demands postural rest for the vulnerable subinfected apex as well as for the badly wounded one. Dorsal decubitus grants it to neither. Lateral decubitus, on the other hand, lands us in a highly responsible dilemma of evils. What "ought" to be provided is, in theoretical strictness, the utmost respiratory rest for the vulnerable apices, and the utmost respiratory activity of the non-vulnerable bases: for the bases are the appointed dispensers of nature's "open air" lung cure. Our children are being taught "how to breathe" for self-protection. Sanatoria have not yet begun to teach

¹ Medical Record, October 7, 1916.

² New York Medical Journal, November 11, 1916.

their patients "how to breathe the open air," yet this is the only remedy they prescribe for the cure of the damaged lungs.

THE X-RAY TREATMENT OF PULMONARY TUBERCULOSIS. Jefferson D. Gibson's¹ paper, illustrated with 17 skiagrams, claims for his method striking results differing from all others in the nature and permanence of the healing process. Three weekly ten-minute exposures (at a distance of twelve to fifteen inches) to a ray of about 10 milliamperes alternate with three treatments by static electricity (brush discharge) to stimulate the metabolism. Daily ozone, or ozonized oil nebula inhalations, together with the most judicious use of all the common hygienic measures, complete the systematic course. His contention is that the x-rays heal the lung, not by encapsulation, but by elimination of the tubercles, of the tuberculous infiltrate, and of all "fibroid" material; the densely fibrous organized scar being alone refractory to it. Of the 139 patients treated by him during the last twelve months, 93 per cent. survive; and 128 of them have an excellent change of permanent recovery and usefulness, because much of their damaged tissue has been restored to almost normal function by this method.

"ARE THE ULTIMATE RESULTS OF ARTIFICIAL PNEUMOTHORAX AS FAVORABLE AS THE EARLY?" This has not yet been conclusively determined. A. G. Shortle's² valuable review of his own experience and of that published in America and elsewhere, is a definite step toward that long-delayed information. Of his own series of 104 cases between May, 1912, and August, 1914, 25 were futile (1 in 4), owing to inoperable adhesions; 35 of the remaining 79 are dead; 2 were "worse;" 18 "improved;" and 21 discharged as "symptomatically cured." Of these 21, 19 were third-stage, 2 were second-stage cases, 17 were progressive, and 4 were stationary. The sputum test was positive in all. All were febrile cases, and all had tried the usual rest cure and climatic treatment. The majority were uncured sanatorium cases; and treatment had been stopped—in 2 for four years, in 4 for two years, in 5 for one and one-half years, in 6 for one year, and in 4 for six months or more. All but 3 have been traced; 2 relapsed and died; 15 are still well and working; and 3 were likewise fit when last reported. All except 3 of the recently operated have fully reabsorbed, as demonstrated by physical examination and fluoroscope: 7 have no sputum whatsoever, 2 negative sputum and 4 positive; of the others there is no report. The total duration of treatment varied from four to thirty-four months, the average being 15½. In addition to those 21, 6 were discharged much improved and able to take up some employment; 3 are still working though showing physical signs; 1 has died and 2 are in poor shape physically.

His results being much better than those reported by others, Shortle attributes the difference to the following factors: (1) Most were treated in his sanatorium at complete rest. He agrees with saugman that the procedure should not be undertaken outside an institution. (2) The majority were of the intelligent middle class, and with means to afford proper living conditions. (3) The climate of New Mexico is a favorable

¹ New York Medical Journal, March 3, 1917.

² Journal of American Medical Association, October 28, 1916.

one. (4) The insufflations of gas were small, never exceeding 500 c.c.; as a rule only 250 to 350 c.c. The habit of introducing 800 to 1000 c.c. at one operation is sufficient explanation why a given operator has not had success with artificial pneumothorax.

A. Koefoed¹ reports excellent results in 33 unilateral subjects. After six months (or from one to five years in most) they were equal to their hard labor, and the better for it as regards reabsorption and expansion. In an aggregate of 200 cases at the Silkeborg sanatorium 90 were non-inflatable; and, of these, 57.9 per cent. died since, and only 14.4 per cent. were reported self-supporting. Of the 110 patients treated, 31.3 per cent. recovered full earning fitness; but in 37.4 per cent., the disease progressed to a fatal termination.

THE MEDIASTINUM, LYMPHATIC GLANDS AND PLEURA.

Diaphragmatic Gastric Hernia. This had resulted, in O. J. Seibert's² case, in the passage of the entire stomach, through an enlarged esophageal foramen, into the posterior mediastinum where it was confined immediately behind the heart by dense fibrous adhesions exclusively limited to the pylorus and to the margin of the ring. In this remarkable instance the great fluctuations in gastric volume day by day must have taken place with direct pressures upon the tethered auricular, instead of upon the freely mobile ventricular segment of the heart. Clinicians would have been puzzled by strangely versatile findings, had a casual dorsal percussion led them to make continuous systematic examinations of the back. These would have revealed to them the intermittent presence of the auscultatory physical signs of "gas," of "splash," and of "gurgle."

Simple Ulcer of the Esophagus Perforating the Thoracic Aorta. The first large hemorrhage occurred on July 28, two hours after some streaked secretion was raised. The small aortic opening was presumably sealed by clot, as the fatal hemorrhage did not take place until twenty-four hours later. Great clinical interest attaches to the fact that there was no history of any symptoms, although the scar of another ulcer was closely adjacent. The ulcer was an old one at the junction of the esophagus and stomach; it was perhaps the result of typhoid fever six years before. J. B. Christopherson, director of the Civil Hospital at Khartoum, dwells, in his remarks on this case in the *Lancet*, March 10, 1917, upon the remarkable absence of pain or discomfort on swallowing, except for the last two days. It may, therefore, be impossible to even suspect the presence of a simple ulcer in the esophagus. The diagnosis of the site of perforation (in esophagus, or stomach, or duodenum) is always difficult. In perforation into the left pleura, the subjective symptoms resemble those from gastric or duodenal perforation; but the physical signs are those of pleurisy, not of peritonitis. He also points out that in the esophageal perforation, sitting is more com-

¹ Ugeskrift f. L. November 2, 1916.

² Surgery, Gynecology and Obstetrics, 1916, No. 4, xxxiii.

fortable than lying down, the reverse of that which obtains in gastric perforation.

Vaccine in Mediastinal Actinomycosis. In a pulmonary and mediastinal infection breaking out superficially at the sternal region, which had resisted salvarsan, local treatment by iodides, and massive doses of potassium iodide internally, W. S. Malcolm¹ reports rapid improvement in the discharge, in the sinuses, and in the nodules, under weekly injections beginning with 2,500,000 actinofragments, and increased up to 10,000,000 which produced constitutional symptoms. The dose had then been reduced to 5,000,000 for a continuance. Fifty of these injections were practised; but the later ones were merely to confirm the cure which had already been secured.

Tuberculosis of the Bronchial Glands. Mary E. Lapham's² article ranges over so vast a clinical and pathological field that it is impossible to do justice to all its varied and important aspects. Given the initial peribronchial invasion, which the x-rays alone are able to report, the list of the possible developments is appalling in its extent and significance. Suffice it to state that the consequences which she enumerates include meningitis; laryngeal disturbances resembling croup, diphtheria, and whooping-cough; erosion of the esophagus, trachea, bronchi, and blood-vessels; asphyxiation; hemorrhages; hemoptysis; acute miliary tuberculosis; acute tuberculous pneumonias; chronic bronchitis; asthma; emphysema; bronchiectasis; atelectasis; pleurisy, and tuberculous peribronchial infiltration of the lungs.

The Treatment of Hodgkin's Disease is discussed by Yates and Bunting,³ in connection with its various types and phases. On the whole, they deprecate extirpation when it cannot be complete. Though partial excisions are often followed by some improvement, they are not curative. They regard the Röntgenizing of the wound, both immediately and repeatedly, as a stringent duty in order to reduce the liability to dissemination by any operation. They are strong believers in the use of an immune serum in spite of an initial and sometimes considerable enlargement of the glands, as this soon subsides. Patients who tolerated the serum seemed to improve more rapidly and permanently than without it. Arsenic, which has been almost exclusively prescribed, "is without any specific lasting value, whether as Fowler's solution or as salvarsan." Some more effective chemotherapy is needed. Meanwhile fresh air, sunshine, and proper feeding are superior to any drugs when there is no special indication for tonics and the like.

Oxygen Perflations in Purulent Pleurisy are reported by Dehau and Roux,⁴ as singularly efficient for the control of sepsis where antiseptic washings fail. Oxygen is passed at a low pressure from the wash bottle, by means of a No. 18 or 20 Nélaton catheter, through the pleural drain, deeply into the pleura, for one or two daily sittings of an hour. In one instance, where the treatment was interrupted for four days, the pyrexia

¹ British Medical Journal, October 7, 1916.

² New York Medical Journal, October 21, 1916.

³ Journal of American Medical Association, March 10, 1917.

⁴ Paris méd., November 11, 1916.

immediately returned, but was again at once suppressed by its renewal. In their 11 patients, the suppuration ceased within a few weeks. They state that, in wounds of the extremities or in suppurative arthritis of the knee, the beneficial action is far less striking than in the pleura.

Artificial Pneumothorax for the Cure of Acute Pulmonary Abscess. W. D. Tewksbury¹ relates his two trial cases which were quite successful. He refers to A. E. Greer's report, in the same journal for April 1, 1916, of a case of postpneumonic interlobar empyema draining through the bronchus, as the nearest approach to systematic employment of this procedure for acute abscess of the lung with open bronchial communication, which he thinks is a new departure. He states that, without surgery, the mortality of acute abscess is about 60 per cent., and the percentage of cures only about 10 per cent. With rib resection and drainage, the mortality is still 30 per cent., and recovery is slow. Compression is a rational method in cases with an opening into the bronchus. Its adoption whenever possible will probably greatly improve the record in the future.

HEMADENOLOGY AND THE THYROID.

Ductless Gland Therapy is urged by C. E. de M. Sajous as the general practitioner's duty in special relation to eugenics and to the prevention or reduction of the incidence of mental inferiority and of mental defect in the coming generation. This, he thinks, is attainable by timely systematic treatment of the mother, and subsequently of the infant. If a definite impression can be made upon the development of the brain, *a fortiori*, might the inadequacy of any less complex organs be amenable to a judicious systematic therapeusis? That object lesson would thus open up a new field of medical helpfulness of undreamt extent and beneficence.

Successful Dietetic Treatment of Addison's Disease by Sugar. The text for L. R. Grote's² inferences is the rapid improvement of a young man prostrated by severe primary Addison's disease, unrelieved by suprarenal treatment, and ultimately treated by extra supply of sugar. After eight weeks of this he had gained appetite and weight, could walk for an hour without fatigue, and had lost some of the pigmentation. He finds that two-thirds of the bad cases examined have yielded an abnormally low blood content of sugar; while the tolerance for sugar was exceptionally good. In his case 100 grams of levulose, or 200 grams of grape-sugar caused no sugar elimination in the urine. In two weeks after 100 grams had been added to the usual 300 grams of carbohydrates of the daily diet, the blood-sugar (before breakfast) rose from the initial 0.05 per cent., to 0.056; after eight weeks, to 0.1 per cent., and after nine weeks, to 0.9 per cent., with parallel clinical progress. In addition to this dietetic, and to the opotherapeutic treatment, Grote employed carbonated baths, Arnoldi having recently observed that they stimulate the

¹ Journal of American Medical Association, March 10, 1917.

² München. med. Wehnschr., November 14, 1916.

suprarenal function, and raise the blood-sugar coefficient after the bath, producing, as it were, "an asphyxia hyperglycemia."

The Experimental Production of Congenital Goiter. R. McCarrison¹ believes that congenital goiter is due to the action on the fetal thyroid of toxic substances derived from the maternal intestine. These substances are the products of microorganisms originating in fecally contaminated soil which are conveyed to man and animals by infected food and water. The results of the series of experiments which he reports afford, he thinks, material support to his view of the etiology of goiter.

Two New Signs of Thyroid Abscess are described by F. H. Lakey² in addition to those previously recorded: namely, limitation of the chin elevation; and chin depression on the sternum when swallowing. Their mechanism is brought out by the stretching tension of the sternohyoid, and omohyoid muscles, which interferes with their normal function.

The Action of Iodine upon the Thyroid, and through it upon the Economy is becoming of increasing clinical interest. D. Marine and J. M. Rozoff's pharmacological research, published in Baltimore last October, enables them to confirm the view that the definite histological changes in the gland (which are involuntary) are due to a decreased functional thyroid cell activity and to an increased storage of the active iodine-containing hormone. After 50 mg. potassium iodide injections into the circulation, the storage of the iodine is practically instantaneous; but the pharmacologically perceptible increase in hormone elaboration is only observable after several hours. The involuntary changes may be definitely recognized after twenty hours.

The Treatment of Graves' Disease by the Röntgen Rays. We extract from Malcolm Seymour's³ valuable paper its essential conclusions, which reflect the latest status of a long-vexed question. "All writers on the subject of *x*-ray treatment of hyperthyroidism have come to the following conclusions: The pulse-rate is nearly always reduced, and this almost always at once. The tremor and nervous symptoms improve from the start. The gland rapidly diminishes in size in some cases, or remains unaffected in others, but if hard, tense and throbbing, the throbbing diminishes and the gland becomes softer. The body weight practically always immediately increases. The advantages of this treatment are: (1) There are no fatalities. (2) There is no resulting scar, as after operation. (3) It does not interfere with the patient's occupation. (4) It is painless and causes very little inconvenience to the patient. (5) If unsuccessful, an operation may be done with less risk, because of the favorable action of the *x*-rays on the thymus gland. The *x*-ray treatment of Graves' disease should not be undertaken except by those thoroughly experienced in röntgentherapy. The dosage must be accurately measured; for, if the rays are applied in a haphazard manner without knowledge of the total dosage, the result may be unsatisfactory, resulting in serious burns or in total destruction of the gland, causing myxedema.

¹ Indian Journal of Medical Research, July, 1916.

² Boston Medical and Surgical Journal, January 18, 1917.

³ Ibid., October 19, 1916.

The diagnosis of hyperthyroidism is frequently overlooked. This is generally mistaken for so-called neurasthenia, and is also frequently confused with early pulmonary tuberculosis."

Persistence of Exophthalmos after Recovery from Graves' Disease. R. Mackinnon's¹ instance, was that of a man, aged thirty-five years, examined postmortem after a lobar pneumonia, who had developed exophthalmic goiter in the Boer war in 1901, was treated ineffectually for three years in England, and with gradual improvement for two years in Vienna, where he completely recovered in 1906 but for the disfiguring eyeball protrusion. For this he submitted in Switzerland to some quack intra-ocular injection, which was unavailing, and destroyed the sight of the left eye. In spite of this disablement he had been accepted for active service, which proved to be very strenuous, during the first sixteen months of this war. At the autopsy the heart, spleen, suprarenals, pituitary, and the small persistent thymus were normal. The thyroid was of normal size, with increased vascularity, and with relative increase of the glandular at the expense of the colloid constituents. The only change in the orbit was the depth of the retro-ocular space which was filled with fat. A striking feature in this case was the absence of any relapse of the main disease under conditions worse than those which had originated it.

THE RESPIRATORY AFFECTIONS, PULMONARY AND BRONCHIAL.

The Psychic and the Parasitic Factors in Functional Affections of the Respiratory Tract. At the Thirty-eighth Annual Congress of the American Laryngological Association two interesting papers, by the President, G. Hudson-Makuen, on the "Psychology of Diseases of the Respiratory Tract," and by J. L. Goodale on the "Diagnosis and Management of Vasomotor Disturbances of the Upper Air Passages," brought into light for discussion the contrast and the mutual coöperation between two leading features and determining factors, inherent practically to all the functional disorders of breathing, of phonation, and of articulation, which we might perhaps identify for brevity as the "psychic incubus" and the "parasitic incubus." Hudson-Makuen discusses the first and its psychotherapy; Goodale, the second (mainly in the shape of the evil of some foreign proteins), and its treatment by general or by special immunization, *viz.*, by desensitization in anaphylactic cases, and by vaccine therapy if any microbes should be out in the field. The range of both papers is too vast for our reporting. But we note the result that both of them inevitably overlap, by recognizing the bearing of the other factor upon that which was, at start, their own exclusive theme.

Asthma and Latent Tuberculosis. J. Frenguelli² publishes two illustrative cases of that association from his wider clinical observations, both occurring in male adults. Although no lesion could be identified, the signs suggested the existence of tuberculosis. On the further assump-

¹ British Medical Journal, October 7, 1916.

² *Semana méd.*, 1916, xxiii, 49.

tion that their asthma was an anaphylactic reaction to bacillary toxins, he treated them with tuberculin. Definite improvement resulted, and the asthma completely disappeared in both of them.

Nerve Shock. Among the many object lessons in pathology furnished by the war, not the least important and far-reaching bears upon the individual liability to nerve shock, and the best means for its prevention and its cure. Freud's theory of the psychoneuroses, and the value of psychoanalysis as a form of mental training, so mercilessly exposed by Charles Mercier, have had a supreme test. To quote an able editorial in the *New York Medical Journal*, "Self-discipline is superior to psychoanalysis at all times; and personal development and happiness cannot be divorced from self-sacrifice. The severe demands of war and the rigid discipline of military training have quickened the instinctive emotions and transformed the repressed energies into great and heroic bravery." The latency of the neuropathic tendency prevents its detection by merely physical examination. But the neurotics are apt to break down under the first severe strain, as unequal to the mental and moral shocks of war. This urges the lesson that self-discipline should be one of the first, if not the first, aim of our education. Without it we lack the only efficient preventive against the creeping disease of "overcivilization."

The Alleged "Nerve-Leaks," and Baines' Dielectric Oil. W. M. Bayliss¹ puts us right as to these fallacies. T. Lewis has photographed the string galvanometer distortions produced by the metal electrodes. Ions are not electrons; and the latter do not exist free in the solutions containing the former—the electrolysis of salts not involving any disintegration of their atoms. Electric changes in cells are probably due to the separation of the positive from the negative ions by the interposition of a membrane through which only one kind of the ions is able to pass—Helmholtz's "double-layer." He has been unable to identify the areas of leakage with any nerves or areas of distribution. There are simply moist areas of conductivity. As regards Baines' assumed continuous flow of "neuro-electricity" from the brain, no proof of any kind is given; and, whatever may be the nature of the nerve impulse, it is certain that there is no continuous stream of energy, and all that we know points to its being connected with the concentration of certain ions at membranes.

The "dielectric oil" is merely ordinary liquid paraffin. It does not pass through the skin, and cannot reach any nerve or internal tissue.

Neurotic Tachypnea, its Analogies and Contrasts with Neurotic Tachycardia: a Contribution to the Study of the War Neuroses. This wide subject can be only broadly sketched in a few lines. Respiration and circulation are two inseparably linked and reciprocating mechanisms. Their common origin and development is from the automatic rhythmic pulsation of the fetal vascular tissue from which the primitive heart tube and its branchings are molded into shape. The movement thus imparted to the blood becomes, at a later stage, the means of stimulating

¹ British Medical Journal, March 24, 1917.

two separate medullary centers, respectively entrusted with controlling power over the cardiovascular, and over the respiratory motor, mechanisms. From that common motile origin, two parallel automatisms are ultimately evolved, which differ in kind owing to the different nature of their automatic medulla-stimulating agency. For the automatic circulatory mechanism the stimulating force remains, so far as we know, mainly mechanical; but for the automatic respiratory mechanism, the working stimulus is mainly chemical, in the shape of the CO_2 derived from tissue oxidation. Owing to the complex innervating functions of the sympathetic and of the cerebrospinal system (including endocrin innervation), both automatic mechanisms fall under somatic and psychic interference, and into a resulting liability to neurotic aberrations.

The cardiovascular automatism is remarkably versatile and self-adaptive. On the other hand, the chemistry of the body can never be suspended, and the balancing of its chemical accounts allows of no postponement. This may perhaps explain why the major aberration of "tachypnea" should be incomparably less common than that of "tachycardia;" to the extent that it has been passed *sub silentio* in all our latest systems of medicine, and is not even mentioned in the index of their recent editions. It is conceivable that the continued neglect of its study may be in some degree responsible for our lack of progressiveness in the elucidation of the enigma of asthma. Another proof of that great disparity in incidence is the dearth of recent observations in the medical literature of the war. And yet, strangely, a single observer A. Fara, who describes the condition without specifying its name in his "Contributo alla clinica delle Neurosi respiratorie" in the *Policlinico* for June 18, 1916, reports 5 instances of it, all in men, 4 of whom were soldiers. This is conclusive as to the unfitness, for any inclusive nosological specification, of the term "hysterical tachypnea," which during my early career at the Brompton Hospital was the label attached to the extreme and inveterate neurosis of an incurable chronic "habitué" of the out-patient department. It also encourages the hope that the great war, which has matured so many "neurotic" problems, may yet supply a nucleus of retrospective reports which may start into activity this long-delayed and important line of investigation.

Tachypnea, not an unfamiliar term in physiology, and in constant personal use for years by a few clinicians, is strangely foreign to our general clinical literature. Murray's great dictionary mentions it incidentally in the long paragraph it devotes (1916) to the many compounds of "tachy." It supplies, however, a special paragraph for "tachycardia;" though stating in error that the genuine significance and proper use of the word identify, not a mode of heart action, but a special disease. On the contrary, our nosology, by specifying the most familiar variety of this clinical complex as "paroxysmal," avers that the genuine significance of "tachycardia" is truly that of a symptom. In reality "tachycardia" is a word of comparatively modern date. The 1848 to 1854 edition of Stephanus' great *Thesaurus Linguae Græcæ* does not mention it. But Hippocrates used "tachypnea;" and the *Thesaurus* quotes a line from him which gives it side by side with

"dyspnea." It has therefore a substantial claim, in addition to that of convenience, to our current clinical use.

For brevity, a terse abstract of Fara's paper is reproduced verbatim from the *Journal of the American Medical Association*, July 29, 1916. "Fara describes 5 cases of what he calls respiratory neuroses. The clinical aspect at first glance seemed to resemble nervous asthma. But examination identified the margin of the lungs as higher than normal; while the stethoscopic findings were negative, and there was no cough. The noisy inspiration and expiration sounded like the panting of a dog. The respiration rate was from 150 to 180 during an attack; but the breathing was excessively shallow. The play of the muscles was reduced to almost nothing, the spasm contracting all the muscles concerned in the breathing act. The diaphragm, in the most extreme case, seemed to be paralyzed. It persisted immovable in the expiration position while all the other muscles were in the inspiration position. The spasm subsided during sleep, and also at intervals during the waking hours. The patient was a mountaineer, aged thirty-two years, apparently robust except for this neurosis. It did not interfere with his work as custodian of a church, but he was unable to do any fatiguing work. Emotional factors seemed to aid in bringing on the attacks. In the intervals respiration was abnormally slow. And during an attack the respiration sometimes returned to the usual rate when the attention was diverted, as in the course of shaving. The 4 other cases were in soldiers; the emotional factor was also evident in each."

A series of interesting speculations are suggested by the obvious analogy with the canine "fender-panting." In the latter, two facts stand out prominently: (1) The normal respiratory rhythm is replaced by another rhythm characterized by a systematic "regularity," entirely free from that fluctuating unevenness in frequency and in depth which adapts successive breaths, under constantly varying medullary stimulations, to the fluctuating requirements of "blood ventilation." In short, the medullary control over the rhythm is suspended. This reminds us of the analogous loss of medullary control evidenced in the "run-away rhythm" of the auricular beats in auricular flutter and in auricular fibrillation, (2) The "blood ventilation needs" are provided for, as it were in anticipation, by that regular frequency of minimal alveolar ventilations—not only adequately, but in slight excess, as shown by the short recurrent intervals of apnea. Another purely canine feature is the steady protrusion of the tongue, and the respiratory synchronism of its oscillations. These demonstrate, first that the hyoid musculature is in a relaxed state; and, secondly, that the opposed muscles are worked by a mutual contractile reflex. We might venture to regard this as a "tongue-clonus;" and to draw the inference that it is the visible extension of a "general clonus" of the entire respiratory musculature.

Applying this tentative interpretation to the human "neurotic tachypnea," we find some plausible support for it in Fara's two chief observations; namely, that the diaphragm is "inactive," and is in the expiratory position; and that all the other muscles are in an inspiratory posi-

tion ("probably," we may suggest, "in a medium-inspiratory position"). Turning to the *foot-clonus*, we note that the essential for its voluntary production is an attitude which furnishes a perfect balance between the leverage of the flexor muscles and that of the extensors. Lastly, self-experiment convinces us that a volitional inception of the panting rhythm is absolutely precluded by the position of extreme inspiration, whether thoracic or abdominal; and likewise by any extreme expiration, either thoracic or abdominal; and much more by a complete thoracic-abdominal expiration.

Our provisional general conclusions are: That the human respiratory run-away rhythm differs from the canine in being exclusively morbid, whereas panting is one of the normal respiratory functions in the dog; that it further differs in sometimes originating from an emotional causation, and also in remaining under the modifying influence of the fluctuating human psychical factor; but that it probably resembles the canine panting in being dependent upon a partial suspension of the medullary regulation, and in being determined and maintained by the substitution of a general respiratory clonus for the neurohemic regulatory mechanisms. "Functional tachypneics" can maintain permanently a level blood ventilation for ordinary purposes. But they are incapable of any severe exertion, and liable to dyspnea if they should attempt it.

Miners' Phthisis in South Africa. The report on "Silicosis on the Witwatersrand" by Watt, Irvine, Johnson, and Steuart, 1916, is a fund of information. One cubic meter of the dusty atmosphere from blasting or drilling may contain 86,000,000 particles; this is much reduced by efficient water jets. Probably very little harm is done by the carbon monoxide and nitrous fumes; much more by tubercle bacilli in the mines. Thus 15 per cent. of samples of sputum underground, from shafts and main traveling ways, showed bacilli; as against only 2.5 per cent. of samples from the living rooms on the surface. The tubercle bacillus will survive for at least two months in acid mine waters. Segregation and the prohibition of spitting are clearly indicated. "Early silicosis" is a discrete fine fibrosis from dense aggregation of dust particles along the small bloodvessels and bronchioles; and in the interalveolar, interlobular, and subpleural tissue to a less extent. The lung appears almost normal, but for scattered pigmented areas. The *x*-rays show a slight increase in the opacity of the lung, which is a little mottled and unduly streaky. In "intermediate silicosis," the pleura is a little thickened; the lung tissue is tough and mottled, the cut vessels and bronchioles stand up from the cut surface, the pigmented areas are larger and more palpable than normal, and small silicotic nodules can be both seen and felt. "Advanced silicosis" consists in the development of nodular and massive fibrosis throughout the lung tissue. The bronchial glands are definitely enlarged. Under the *x*-rays these lungs present what is called a "snowstorm" appearance, often partly due to a chronic tuberculous infection. The prognosis is not bad in early silicosis, and good practical recovery may take place even in late medium silicosis; it is certain that no man with definite pulmonary silicosis should continue to work underground.

Pleuropulmonary Complications in Heart Disease. The leading idea in H. Vaquez's¹ contribution is that a "left" ventricular inadequacy is at the root, not only of the dyspnea of effort, but also of cardiac asthma, which resembles angina in sometimes supervening in recumbency; and in likewise insensibly merging into pulmonary edema. In animals, acute edema of the lungs is known to have resulted from overtaking the ventricles with intravenous saline. Clinically, too, subcutaneous infusions, or an excessive supply of fluids may produce it, as in many cases of renal insufficiency, or of high arterial pressure, or of general arteriosclerosis. Other functional factors and a nervous element may come in; but the main cause is the ventricular overload. The greater frequency of "right" pleural effusion in cardiopaths is probably attributable to the mechanical consequences of an overweighted, congested liver. Aspiration should never be delayed, as it revives the heart and makes it again responsive to digitalis; and it should be repeated indefinitely whenever indicated.

The Pathology of Trench Nephritis in the Light of its Associated Pulmonary Lesions. A microbic origin had been suspected but not hitherto discovered; the nearest approach to its identification being Mackenzie Wallis' observation that the injection of filtered urine from trench nephritis into rabbits and monkeys caused a severe illness after eight days, but that urine which had been heated to 55° C. produced no illness. This suggests that an ultramicroscopic, filter-passing virus might be present. Meanwhile, Lieutenant J. Shaw Dunn and Capt. McNee's theory is, that the primary lesion is in the "lungs." According to Sir John Rose Bradford's² report on 1455 cases, the disease is characterized by five features: The rapid subsidence of well-marked renal dropsy; the frequent presence of bronchitis and dyspnea; the severity and suddenness of the onset of uremic manifestations, such as epileptiform seizures; the rapidity with which inflammatory complications occur; and the low mortality, which had not exceeded 3 or 4 per 1000. In a discussion at the Royal Society of Medicine in February, 1915, Langdon Brown said that usually edema was the first symptom, often accompanied by shortness of breath; that bronchitis was common; and that a fair proportion of patients had complained of sore throat. F. W. Andrewes had found, at a later stage, typical acute glomerulonephritis, proliferation of the epithelium of the capsule, and in the tubules degeneration and desquamation of the epithelium, with interstitial cellular infiltration. In about half of R. G. Abercrombie's 500 cases in the acute phase, the premonitory symptoms in order of frequency were bronchitis, febrile symptoms, and abdominal pains and vomiting. The constant and outstanding pathological feature in Dunn's acute cases is the plugging of the glomerular capillaries with masses of cells, apparently endothelial; while the tubular changes, when present, are mainly reactive, by mitosis in the epithelial cells. The name "intracapillary capsulonephritis" expresses this particular type of glomerulonephritis.

¹ Arch. d. mal. du cœur, x, 1.

² Quarterly Journal of Medicine, 1916, No. 34, ix.

But remarkable lesions have also been observed in other organs, especially the lungs and brain, which may afford a clue to the causation. The lungs were examined in 7 cases. In 3, the acute lesions were indistinguishable from those produced by chlorine or shell-gas; in the other 4, they were similar: *viz.*, total destruction of the epithelia of the terminal bronchioles and infundibula; deposition of fibrinous exudate on their denuded surfaces; and often an inflammatory collection of polymorphs and of lymphocytes. In the adjacent pulmonary capillaries, hyaline thrombi were found in 6 of the cases. The probability suggested itself of a close connection between these pulmonary thrombi, the glomerular changes, and the peculiar punctiform hemorrhages in the brain in some cases. Like conditions were also found in the kidneys and brain after gas poisoning. In both affections the punctiform cerebral hemorrhages were presumably due to the hyaline plugs in the capillaries, though in many these could not be found. Two cases of acute poisoning by shell-gas showed the typical lung changes; but, while one of them presented hyaline plugs in the glomerular capillaries, the other showed some proliferation of the vascular endothelium in the tufts. This suggested that the proliferation of glomerular endothelium in trench nephritis represents the local cellular reaction set up by similar hyaline plugs, which are then probably disposed of by phagocytosis. This novel view of the kidney lesion as being, in the first instance, purely mechanical certainly affords an explanation of the extremely local and uniform character of the early change. Dunn's further statement that brain hemorrhages precisely similar to those recorded had been produced experimentally by non-toxic emboli is specially instructive. It seems to disprove the current view that such vascular lesions must necessarily be toxic in origin. The pulmonary changes are most significant in relation to the dyspnea which is so prominent a feature of this type of nephritis, and to the bronchitis which so commonly attends it. According to Dunn's theory, the sequence of events would be as follows: Some irritant is inhaled; it causes acute damage to the terminal bronchioles and infundibula, which is accompanied by thrombosis in the pulmonary capillaries. Thence the thrombi are transported as emboli into the capillaries of various organs, where they cause characteristic lesions in certain situations. In the brain they give rise to minute hemorrhages. In the kidney the emboli lodge in the glomerular vessels, causing reactive proliferation of the endothelium and their occlusion; the glomeruli, being thus deprived of blood, are thrown out of action and the symptoms of nephritis follow. Those suggestions are advanced with due reserve. The cases of nephritis gave no history of recent "gassing;" and the nature of the inhaled irritant being so far undetermined, the "primary" character of the lung lesions needs confirmation.

Cerebrospinal Fever Prevented by a Respiratory Method. Col. W. H. Parkes,¹ surgeon to the New Zealand Expeditionary Force, reports complete success on board the transports, and also successful control over the disease in New Zealand after a trial of six months. All troops

¹ British Medical Journal, February 24, 1917.

before embarkation have the nasopharynx examined bacteriologically, only negative cases being allowed to proceed. The rejects and the contacts are treated by a steam apparatus similar to that described in the *Journal* by Colonel Gordon and Captain Flack. A disinfectant solution is sprayed into the air of a room of 700 cubic feet capacity, the steam atomizing it from a vessel containing 1 per cent. solution of zinc sulphate, of which 1 liter suffices for twenty minutes. Eight carriers can thus be treated in the prone position, inhaling for five minutes the misty air freely through the nose; this temporarily destroys the meningococcus in the nasopharynx. The inhalations are repeated daily for three, four, or five days until the results of the swab examinations are negative. These inhalation rooms are fitted up at the military camps, and also on all transports proceeding to England.

"Gassing" Treated by Rhythmic Inhalations of Oxygen under Pressure. Chassevant¹ reports good results, in ambulance cases two to eight hours after injury, from repeated sittings of this treatment, which is practically an oxygen "insufflation," such as used by d'Arsonval in carbon monoxide poisoning. The India-rubber tube from a small, specially provided cylinder is passed into the back of the mouth; and by opening and closing the stop-cock short rhythmic insufflations are made, about 15 to the minute. Pulmonary ventilation is thus secured, with avoidance of the severe pain associated with any inspiratory effort after chlorine inhalation. To combat cardiac weakness, a daily massive hypodermic of camphorated oil (5 to 15 c.c. or more) is recommended.

INTENSIVE IODINE ADMINISTRATION FOR PULMONARY REPAIR after "gassing" is strongly advocated by L. Boudreau² on the strength of the healing power for damaged tissues which is demonstrated by the success of his treatment of pulmonary tuberculosis by increasing doses of the strong alcoholic tincture (1 in 12, free from any potassium iodide) taken several times daily, over prolonged periods, in water, or in milk, or in any other beverages which disguise the taste.

Paroxysmal Cough and the Lingual Tonsil. Mark Hovell makes out a strong case for this derivation in his presidential address reported in the *British Medical Journal*, November 3, 1916. In particular, he attributes the postinfluenzal tickling cough to contact of the swollen gland with the epiglottis. Chloride of zinc (15 to 30 grains to the ounce with a trace of dilute HCl) suffices in many cases; but trichloroacetic acid is the most effective remedy. A mirror is indispensable. To insure the quantity of acid being small it has to be carried by a very thin layer of wool on a wool-holder bent at a right angle. In one case the distressing cough had lasted fifteen, in another seven years. In both instances it subsided *pari passu* with the swelling of the lingual tonsil.

Garlic in Whooping-cough. Mark Hovell, who suggested this remedy in the *British Medical Journal*, July 1, 1916, adds the following particulars under date of February 24. "I believe the juice of garlic

¹ Jour. de méd. et de chir. prat., March 10, 1917.

² Jour. de méd. de Bordeaux, September, 1916, No. 11.

kills the microorganism of whooping-cough, but in some cases this is not sufficient to reduce the swelling of the lingual tonsil, which, by touching the epiglottis, causes the cough; and therefore it is necessary to make applications to the root of the tongue with a strong astringent in order to stop the tickling. I find a strong solution of iron (240 grains to 1 ounce), made with equal parts of glycerin and water, effective and preferable to trichloroacetic acid, as it does not cause the discomfort which sometimes follows the application. A preparation is now being made which will enable the *juice of garlic to be taken by the mouth*; which, if equally efficacious, will be better and more convenient than cutting into thin slices and wearing them between two pairs of socks, so that the juice may be absorbed through the soles of the feet."



FIG. 6.—Case 1. Right lung cut open. The sharp line of demarcation between the bronchiectatic upper lobe and the normal lung tissue of the lower lobe is the interlobar fissure. The upper lobe has been converted into a series of cavities as a result of multiple saccular dilatations of the bronchial tubes. Between the dilated bronchi the lung tissue is largely replaced by densely firm fibrous tissue. Very little air-containing pulmonary structure remains. No gross evidence of pulmonary tuberculosis could be found. The lower portions of the lung show passive congestion and slight edema. The opposite lung shows the lobar pneumonia from which the patient died.

Bronchiectasis of the Upper Lobes. T. McCrae and E. H. Funk's¹ paper and their 5 cases, suggest a wide range of undiscussed matter for pathological study. The first of them is of great practical interest. The patient, who died of lobar pneumonia at sixty-two years, had been

¹ Journal of American Medical Association, October 7, 1916.

diagnosed and treated at three sanatoriums as a case of advanced phthisis. No bacilli had ever been detected, to warrant that diagnosis; yet bronchiectasis had never been suspected. Those two avoidable mistakes should be borne in mind by future observers; although like instances are very infrequent, if not rare. The extensive fibrosis and dilatations tell their own chronic tale; but not the whole of their pathology. Presumably this was not tubercular; assumedly not obstructive, no blockage of the lobar bronchus being recorded; probably then due

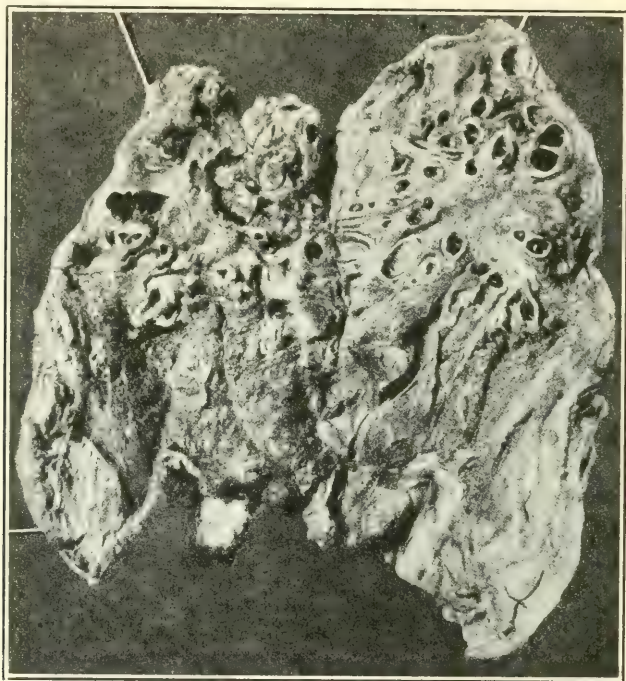


FIG. 7.—Case 2. Right lung. The upper half of lung shows advanced bronchiectasis. The dilatations are for the most part saccular, although cylindric in some areas, as illustrated on the left side, where the bronchus has been split in its long axis. The bronchial walls are not only dilated, but at points markedly thickened. The lesion corresponds probably to the type described as dilatation with thickening in contradistinction to dilatation with thinning. The intervening tissue is dense and firm, and here and there can be found small fibrocaseous areas, not only throughout the bronchiectatic area, but also in the lower lobes. A small tuberculous cavity can be seen in upper right of specimen at apex. The pleura overlying the upper half of the lung was densely adherent and irregularly thickened.

either to a localized primary bronchiectasis, or to a local primary interstitial pleurofibrosis, with secondary bronchiolar dilatation. How did so crippled an apex resist the inroad of the ubiquitous bacillus? Nay we might submit to pathologists the general question: "Why does the common septic bronchiectasis at the base invariably escape secondary tubercular infection? Is this due to microbic or phagocytic activities; or to the superabundant outpouring of mucus?"

The frequent association of some degree of bronchiectasis with chronic fibrous tuberculosis of the apex is nothing more than we might have expected. Its diagnosis by physical signs is impossible. It is an irremediable complication. It can only tend to delay or to permanently hinder the closure of the vomicæ. But a theoretical question remains, which is of supreme interest. Could it perhaps be a blessing in disguise; and that perpetuation of the mucus overflow, possibly an insurance against any revival of the local bacillary activity?

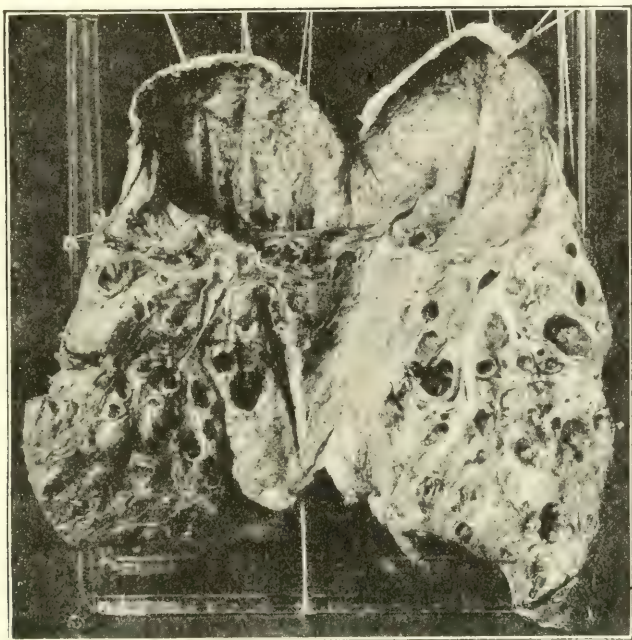


FIG. 8.—Case 3. Left lung. The apex of the upper lobe is converted into a single cavity with a thin, densely firm fibroid wall composed largely of thickened pleura. Microscopic sections of the wall are largely fibrous tissue. The lower portion of the upper lobe and all of the lower lobe are transformed into a series of cavities which intercommunicate in a remarkable fashion. These cavities are bronchial dilatations. The opposite lung showed a lesion of lobar pneumonia at necropsy, and was free from tuberculosis. A discussion as to the character of the large cavity, whether tuberculous or bronchiectatic, or both, is contained in the text.

The other cases are likewise instructive. But it will profit the reader more to study the figures and legends attached to them than to peruse any comments on the full description to be found in the original article.

COMPLETE RESECTION OF THE LOWER LOBE FOR BRONCHIECTASIS is stated by V. Robinson¹ to be the only curative treatment. Everything else is in vain. He has operated five times, with 1 death. He recommends intercostal lobectomy. He also states his opinion that every pulmonary resection should be performed in two, or in three stages.

¹ Surgery, Gynecology and Obstetrics, xxiv, 2.

BLOOD FUNCTIONS AND BLOOD POISONS.

Leukocytic Stability or Fragility as an Exponent of Individual Resistance. The reader may be interested to study the details of P. Mauriac's¹ endeavor to visualize that latent quantity which we usually identify as "general resistance," and largely attribute to the vitality and vigor of our colorless cells. Three drops of blood are shaken and stood for an hour in a tube containing 0.5 c.c. of a solution of 2.06 grams of sodium citrate and 3.6 grams of sodium chloride in a liter of distilled water. After a second shaking, a drop is placed on a slide, stained with methylene blue, and allowed to dry. On examination, some of the leukocytes show up intact, others more or less disintegrated after that ordeal. The ratio between the two counts, namely, resistance divided by fragility, is the "index of leukocyte resistance." In the fasting, normal subject this averages from 0.7 to 0.9; in various diseases it is more or less depressed (as well the red cell resistance to be estimated by the delay in the "laking" and in the resulting coloration of the fluid after shaking). Moreover, from a comparative study of the morbid specimens, he has identified in the young and active leukocytes the presence or the absence of an "oscillation de défense," *viz.*, of a phase of increased resistance preceding an abrupt drop to excessive fragility. He bases upon this observation his inference as to individual prognosis.

An analogous investigation, with special bearing upon the living cells identifiable (by means of tryptic digestion *in vitro*) in avian and mammalian connective tissue, has been published by F. S. Jones and P. Rous.² Their general conclusion is that the origin of our phagocytes is most probably endothelial. At any rate, the living cells which they had isolated from connective tissue evidenced very feeble phagocytic power. These ingest bacteria only when serum is present; suggesting that they require to be activated by opsonins, and possess little or no phagocytic ability of their own.

Colloidal Chemistry and Immunology. M. von Krogh's³ analytical review gravitates toward the main conclusion that, in normal and in pathological blood, *in vitro* and *in vivo*, ferments and antiferments mutually act and react according to the varying balance of their delicate colloid properties. The pathogenesis of many infectious diseases might, he conceives, be explained as parasitic disturbances of that labile colloidal equilibrium. For instance, the morbid colloidal compound of the antigen and of the antibody might mobilize inactive ferments and also disable the normally active ones. That theory may be worth elaborating by further experiments.

The Comparative Resistance of Bacteria and Human Tissues to Certain Germicidal Substances has been tested by Robert A. Lambert in the laboratory of the New York Presbyterian Hospital. His tabulated results bring out various points of clinical interest; for instance, the

¹ Annales de méd., 1916, iii, 4.

² Journal of Experimental Medicine, 1917, No. 1.

³ Journal of Infectious Diseases, 1916, No. 3, xix.

low bactericidal power of the hydrogen peroxide, so much trusted by the laity; and that 10 per cent. alcohol does no perceptible harm to cells immersed in it for an hour. Iodine stands out as the one germicide to which living cells are more resistant than bacteria. On the other hand, it has the property of rapidly dissolving fibrin. Conceivably then, it might delay wound healing. But it is the only one whose solutions can be graduated to kill staphylococci without seriously injuring the tissue cells. A therapeutic trust in that fibrinolytic property was the reason for my believing and teaching many years ago, that in rheumatic fever the initial and continued administration of potassium iodide is a more stringent duty than even salicylate treatment; and later, that its two-hourly small doses in pneumonia at the earliest stage was the most efficient and life-saving treatment in my experience. Since then I have learned the value of "free iodine" in combination with the iodide; and also that of its administration in large doses without the latter, according to Bourdreau's method for phthisis and other affections.

Flavine and Brilliant Green as Antiseptics. These two substances stand out, in the set of best approved antiseptics recently tested and reported upon by Browning, Gulbrandsen, Kenway, and Thornton,¹ as the only ones of which the effectiveness is not impaired by the presence of proteins. Indeed that of flavine is thereby increased far above that of mercuric chloride. Flavine possesses a superiority over brilliant green in its unrestricted destructiveness for the various bacilli, as well as for all cocci.

Both of them, however, accelerate the growth of epithelium and of connective tissue. Wounds treated locally with the usual 1 in 1000 solution healed in half the time otherwise required. Moreover, flavine can be used with a hypertonic solution, as it is soluble in saline injections containing up to 5 per cent. of sodium chloride.

Ether Solution for the Autodisinfection of Wounds. A. Distaso and T. R. Bowen² state that their method shortens by half the duration of treatment. It consists in irrigation (2 liters once daily) with a 2 per cent. ether solution in lukewarm tap water. This is not germicidal to organisms (as shown in control tubes); merely carrying away their pabulum of "corrupted lymph." Its effect is to stimulate the growth of embryonic cells which are bactericidal, as demonstrated in the case of the tubercle bacillus by Maffucci in 1900, and also the outpouring of bactericidal plasma, without clotting the fibrin.

The Viscosity of the Blood. Much labor has been wasted, according to O. Josué and M. Parturier's³ analysis of the question, in vain attempts to determine the viscosity index of whole blood at the time when it was undergoing the latent stages of coagulation, which steadily increased its viscosity until actual clotting occurs. Manifestly it can only be determined in blood rendered non-coagulable; and sodium citrate is the best means to that end. This enables us to ascertain separately the viscosity of the whole blood and that of its plasma. From the

¹ British Medical Journal, January 20, 1917.

² Ibid., February 24, 1917.

³ Annales de méd., 1916, iii, 4.

difference between those two values the viscosity of the corpuscles can be inferred, as the viscosity of whole blood is made up of those three factors. The degrees of that total viscosity run parallel with those of the blood richness in red cells. They plausibly contend that, while the total viscosity influences the mechanical labor of the circulation and is not the least among the determining factors of blood-pressure, the viscosity of the plasma must exercise some influence over the respiratory interchanges between red cells and tissues, as well as over the metabolic exchanges between tissues and plasma. It is therefore in some degree an active factor in the metabolic function of the blood circulation.

The Uses of Thromboplastin Solution, a fine suspension of ox brain in normal saline (with 0.3 per cent. tricesol as a preservative), are further reported by A. F. Hess.¹ It loses little of its potency by cursory boiling, and can be applied as a powder after vacuum drying. The clinical evidence adduced supports his view that it stops hemorrhage wherever locally applied; and he regards it almost as a specific hemostatic in true hemophilia. The other valuable property identified in it is its healing power for torpid ulcers or wounds by stimulating the granulations and the epithelium.

KEPHALIN. Since W. H. Howell first identified, at the Johns Hopkins in 1912, the thromboplastic action of certain lipoids with the presence of some phosphatid having the general properties of kephalin, A. D. Hirschfelder published, in 1916, his researches at the University of Minnesota on the hemostatic uses of an ethereal extract of brain lipoid, the residue from which, or its emulsion in salt solution, when locally applied, renders available the thrombin in the blood, either by simple activation, or by suspending the inhibition from antithrombin. J. McLean has recently confirmed those data, and shown that the heart and the liver also contain an analogous active principle; whereas other phosphatids, such as purified lecithin, heparphosphatid, etc., do not possess, or at any rate equal, the thromboplastic activity of kephalin.

COAGULEN. A. Fonio's² article on the intravenous use of his coagulen or platelets extract, states that in hemophilia a single administration is sometimes curative; although in Werlhof's disease, where deficiency of platelets is supposed to be the main fault, the effect is simply symptomatic and calls for renewal. A systematic course of it in some hemorrhagic diatheses may have to be prolonged indefinitely. The existence of any conditions favoring thrombosis, such as arteriosclerosis, inanition, septic processes, and some stages of syphilis, is an absolute contra-indication.

The Fibrin-formation Blood Test, recently published by H. E. Smith in the *Medical Record*, is a simple means of identifying in any case the tendency to serofibrinous exudations. The drop of blood should not be pressed down by the cover-glass; and it should be sufficiently small not to spread to its edges. When examined after five minutes under oil-immersion it would, if normal, show only an occasional strand

¹ Journal of American Medical Association, December 9, 1916.

² Deutsch. med. Wchnschr., November 2, 1916.

of fibrin. But in early pneumonia, peritonitis, meningitis, empyema, etc., the strands would be conspicuously increased. The diagnostic clinical value of the test is shown by the fact that in several cases the onset of pneumonia was suspected by reason of a positive test before the initial chill was experienced.

The Coagulation Time of the Blood in Pneumonia. The latest research on that vexed question, by George R. Minot and Roger I. Lee,¹ enables them to assert that the time is generally prolonged; and that the opposite conclusion, which had been based upon observations on blood taken "through the tissues," is obviously unreliable. They have investigated many collateral questions of great interest. We can only refer to those bearing upon the calcium content, and upon the practical aspect as to calcium therapy. They find that there is in pneumonia an ample supply of calcium for clotting. The amount of antithrombin varies; usually normal, it is sometimes high, rarely diminished slightly. The fibrinogen, as previously known, is increased. The current belief in the efficiency of calcium therapy derives its support from clinical observations which are not finally conclusive. They have so far been able to ascribe only one condition of abnormal coagulation time of clinical significance to a lack of calcium. The condition is common in obstructive jaundice of several weeks' duration. In this condition the total amount of calcium is actually increased; but there seems to be a defect in the calcium which is available for purposes of coagulation. This lack of available calcium can be corrected by the administration of large doses of calcium salts clinically, or in the test-tube and in experimental animals. For us, the therapeutic objective in pneumonia appears to be, not to increase the coagulability or its rapidity, but rather to lessen and, if possible, to delay it. Calcium salts might be desirable as heart tonics, but only provided they did not hasten or increase the consolidation. The report rather suggests, but does not explicitly assert, that that dreaded risk is purely imaginary.

The Principles of Blood Transfusion. Blood therapy is still in its infancy; and our transfusion therapeutics are still rudimentary. Hitherto the technic of the operation has had for its main study the life-saving purpose of the emergency transfusion. This is, however, but a small section of the therapeutic field. Briefly, the methods employed are either direct, by anastomosis of vessels, with or without a cannula; or indirect (1) by transferring a syringe from a needle in the vein of the donor to a needle in the vein of the recipient, or by using a syringe with a two-way tap leading to the veins of the donor and recipient; (2) by the use of a receiver, either with a paraffin lining or with the addition of some anticoagulant. The indirect method, by employing a glass receiver and sufficient sodium citrate to prevent coagulation, is simple and involves no special dangers. In emergency transfusions there is usually no opportunity, and often less need, for refinement in the selection of the blood supply. It is, however, the first essentials in therapeutic transfusion which is the main theme

¹ Journal of American Medical Association, February 17, 1917.

of A. E. Stansfeld's communication to the Royal Society of Medicine on February 20, 1917. *Non nocere* is paramount; and this alone demands an exhaustive examination of the donor and of his blood, and a tentative trial as to its compatibility with that of the recipient. He states that rigors occur in about 10 per cent. and febrile reactions in about 25 per cent. of transfusions. His cases included aplastic anemias, spontaneous hemorrhages, etc., but his report chiefly bears upon 9 of pernicious anemia refractory to other methods; 4 were decidedly improved; 3 were more slowly improving; 1 was unimproved; and 1 merely kept alive for several weeks. The prognosis depends upon the power of reaction in the bone marrow. Increased red cell production and diminished red cell destruction might result from transfusion. The age of the patient, the duration of the disease, and the condition of the bone marrow, as indicated in the peripheral blood, are the best guides. The optimum dosage is not yet determined. Repeated doses are preferable to large single doses in chronic anemias; and very small doses might sometimes be of value. His results in pernicious anemia with 250 c.c. doses compared favorably, even after a single transfusion, with those reported in America after such excessive doses as 1000 c.c. or more. There is, we might venture to add, a second clause which will claim increasing consideration in the future—"the quality" of the blood gift, both physiological and specific. The specific requirement varies with cases. For some of them for instance, as suggested by O. Leyton, polycythemic blood might be the optimum; presumably, too, for hemophilia, a blood with high clotting-index. The physiological optimum should always include, in addition to the selected factors of age and constitution, a systematic blood training treatment of the donor, according to the latest dietetic, and perhaps medicinal, revelation. If we have practical knowledge of any diet which will provide clean blood, this is the best opportunity for its useful application. The timing and the nature of the last pre-operative meal is also of practical importance.

The Subcutaneous Injection of Fresh Human Blood in hemorrhage of the newborn or from gastric ulcer, and for splenomyeloid leukemia and pernicious anemia, is described by P. F. Holm in the *Journal-Lancet* of December 15, 1916. It is free from the toxic reactions of the intravenous method; and the blood is completely absorbable even when 4 to 8 ounces, or more, are used. In a case of pernicious anemia which was frequently injected, the hemoglobin rose from 30 to 85 per cent., and the red count in a few months from 1,500,000 to over 4,000,000.

Venesection Plus Autoserotherapy is, according to B. Spiethoff's¹ account, an effective, economical, and safe combination, the serum being reinjected intravenously after coagulation. The dosage is important: 5 c.c. may be injected daily—or up to 50 or 100 c.c. on alternate days, and then twice a week, in bad urticaria, eczema, pruritus, gangrenous ulcers, gonorrheal epididymitis and prostatitis, and other inflammations. Ringer's solution 300 c.c., subcutaneously or into the vein twice a week, may be substituted after a while, if indi-

¹ Med. Klin., November 19, 1916.

cated. No serum symptoms occur beyond a transient general and focal reaction.

Intravenous Saline Injections as a Means of Raising Lowered Arterial Pressure were discussed before the Royal Society on November 9, 1916, by W. M. Bayliss. When due to loss of blood, it could not be fully restored by an equal volume of simple saline solution, unless the viscosity of the solution were to be made equal to that of the blood by some colloid, such as gum or gelatin. The effect is then much more lasting, because the osmotic pressure of the colloid prevents the escape of water into the tissues or through the kidneys. Solutions containing gum do not produce edema in the artificial perfusion of organs. When, however, the fall of blood-pressure was due to peripheral vasodilatation, then gum or gelatin solutions, although more effective than pure saline, produced a much less permanent rise than in cases of loss of blood. No resulting signs of heart failure could be detected. The reason why the increase of pressure should disappear again more or less rapidly is still obscure. The combination of a small dose of barium chloride (1 mg. per kilogram of body weight), as recommended by Langley, with a moderate amount of gum solution, was found to be the most satisfactory method in such cases. No diminution of reflex excitability resulted. The view that fall of arterial pressure produces peripheral vasoconstriction by means of nervous channels, and that a rise of arterial pressure produces vasodilatation, was confirmed by the artificial perfusion of a limb.

Bayliss' Gum Solution for Intravenous Injection. A substitute is needed, when transfusion is not available, to save life by keeping up, during the danger period of some twenty-four hours, the sinking blood-pressure (from bleeding or from peripheral dilatation). Prof. W. M. Bayliss¹ details the action and the use of a saline solution (0.9 per cent. additioned with 70 gm. per liter of best gum) which consists mainly of the calcium salt of an acid pentosane, with a small quantity of the potassium salt. This raises beneficially (as calcium is a vasoconstrictor) the calcium content of Ringer's solution; and the usual potassium chloride may be left out of the latter. The requirements are, the same viscosity as in blood, and an osmotic pressure equal to that of the colloids of normal blood. Dextrin may be sometimes preferable. In 2.5 per cent. solution it has a viscosity rather less than that of plasma and a slightly higher osmotic pressure than that of the blood colloids; but its pressor effect is less lasting than that of gum. What becomes of the gum is still unknown. No pentose reaction was gotten in a cat's urine six hours after injection; nor three weeks later in its blood. Presumably, it escapes through the kidney with great slowness; but possibly some of it may be utilized. The risk of anaphylaxis does not seem to arise, judging from negative experiments (in 2 guinea-pigs and 1 cat) after an interval of three weeks.

Shock. THE NATURE AND PREVENTION OF SHOCK owe considerable elucidation to a prolonged research by H. H. Dale and P. P. Laidlaw,² on

¹ British Medical Journal, April 28, 1917.

² Ibid., March 24, 1917.

the shock-like results from injection of histamine, namely, a profound fall of blood-pressure and a striking concentration of the blood by disappearance of one-half of the original volume of plasma in about five minutes (apparently due to the passage into the tissues and lymph spaces of all its constituents). A large part of the blood disappears from effective circulation because the capillaries lose their power of active contraction; and the veins then fail to fill the heart. Moreover, the slowness of the capillary circulation through the muscles and tissues leads to defective oxidation, with resulting acidity, and to a further tendency for passage of water by osmosis from the blood. Effects of the same type can be produced by many products of protein digestion, and of bacterial activity. Among these the toxemic condition of gas gangrene suggests that there is a fundamental similarity of origin for the symptoms in other shock-like conditions.

The point of most novel interest is the importance they attribute to the loss of plasma into the tissue spaces and to the resulting excessive viscosity of the blood, a condition previously recognized clinically as an essential factor in the collapse of cholera and of bacillary dysentery. It is suggested that cases of traumatic shock without hemorrhage, of postoperative shock, of intestinal obstruction, of extensive burns, of anaphylactic shock, and of the rapid fulminating type of toxemia from gas gangrene, may give relatively uncomplicated data for estimating the changes of the corpuscular element of the blood.

As to treatment and prevention, it is pointed out that an antecedent hemorrhage, insufficient in itself to produce collapse, may be an important factor in the subsequent onset of shock, insofar as this is due to deficient volume apart from increased viscosity. The "normal reaction" to a simple hemorrhage diminishing the output of the heart and the blood-pressure, is an abstraction of fluid from the tissues to restore the volume of the blood. That restorative reaction fails in shock. The fluid continues to pass from the blood in spite of the low arterial pressure. A relatively small hemorrhage, therefore, may have a serious influence in determining the onset of shock. Other causes tend to diminish the blood volume—such as fatigue, exposure, or prolonged abstinence from food and water. On the other hand, it may be that measures preparatory to operation in hospital, such as free saline purgation and strict abstinence from food and water, often contribute to the danger. At any rate, the experience of the casualty clearing stations in this war points to exactly the opposite line of treatment from any patient sufficiently strong to face an operation; and clinical practice has anticipated the experimental conclusion that a free supply of fluid into the rectum or the subcutaneous tissues before the operation is needed. The only drug when shock has once developed is *pituitary extract*, which causes a prolonged contraction of the arterioles, and of the total capacity of the circulatory system. *Adrenalin*, apart from its fugitive effect, is open to objection. In place of the physiological saline, "hypertonic" saline is suggested as in cholera and dysentery. The addition of calcium chloride is proposed, calcium-ions reducing the abnormal permeability of capillaries. The defective oxidation of

arterial blood, further suggests the inhalation of oxygen. For the hypertonic injection, the following formula might be tried: Sodium chloride, 2 grams; potassium chloride, 0.05 gram; calcium chloride, 0.05 gram; water, 100 c.c. The value of increasing the relative calcium content beyond this proportion might cautiously be tested. The deficient oxidation and abnormal acidity of the tissues indicate the injection of sodium bicarbonate, as recommended by Wright for gas gangrene. The limited solubility of calcium bicarbonate makes it advisable to give the bicarbonate solution as a separate injection. Hogan and Fischer recommend the following formula for an alkaline hypertonic saline: Sodium chloride, 28 grams; sodium carbonate (crystalline), 20 grams; distilled water, 2 liters.

Bayliss strongly advocates adjusting the viscosity of solutions used to replace blood lost by hemorrhage, and gum acacia as a suitable addition to impart the requisite viscosity, and as a colloid with a definite osmotic pressure. Hogan and Fischer, on different theoretical grounds, have recommended the addition of 2 per cent. of gelatin to the saline solution for intravenous infusion. It is manifest that the aim in treating shock should be to restore the volume of blood in effective circulation, and at the same time to reduce the abnormal viscosity. While 7 per cent. of gum suggested by Bayliss, as bringing the viscosity of the saline up to that of normal blood, would be unduly high, an addition of 2 or 3 per cent. might be safely tried.

THE PREVENTION OF THE SHOCK FROM CHEMOTHERAPEUTIC INTRAVENOUS INJECTIONS. J. E. R. McDonagh publishes his observations in the *British Medical Journal*, April 28, 1917. In man, the shock is either cardiac or pulmonary; the cardiac is more frequent and often fatal; the pulmonary not fatal in his experience, in spite of distressing symptoms, such as swollen lips and tongue, severe cough, dyspnea and partial asphyxiation. Fatal shock may result from the arsenical products now in use, some of the arsenic probably acting as an ion with effects similar to those from aluminium hydroxide which he has studied in animals. The pulse vanishes; the skin pales and sweats; the feces may escape, and are very fluid from intestinal hyperemia. The patient, when recovering, vomits and has excruciating pains in the feet and legs. The best plan is to inject at once into the vein 10 c.c. of a 2.5 per cent. solution of calcium chloride, to which 3 per cent. of gelatin and 5 per cent. of glucose might be added with advantage for the protection of suspension colloids. He believes that shock is due to an alteration in the colloidal state of the protein particles of the serum—which are “emulsion colloids” kept in their emuloid state by the normal hydrogen-ion concentration—the latter being doubtless the same as “complement.” That alteration deprives the colloidal particles of some of their salts, in particular the calcic, thus accounting for the delayed clotting in shock—while many particles are dissolved, the blood becoming more fluid. Calcium chloride seems to prevent the protein particles giving up their salts and going into solution. Ions readily precipitate a suspension colloid when injected, but not if it is given an emuloid coating. If, as he believes, the protein particles of the internal phase are the agents concerned in oxidation and

reduction, any change in their colloidal state will rob the economy of its vital oxygen.

These conclusions are based by him *a*, on 4 experimental results in rabbits; and *b*, on 4 changes in the blood removed from animals during shock. *a* (1) If 1 c.c. of colloidal aluminum hydroxide is injected intravenously, instantaneous death occurs; (2) if calcium chloride is injected intravenously in one ear before aluminium hydroxide is injected intravenously in the other ear, the animal does not die; (3) if calcium chloride is injected intramuscularly the night before the colloidal aluminium is injected intravenously, the animal does not die; (4) if glycerin or gelatin is added to the colloidal suspension before it is injected, several cubic centimeters may be injected intravenously without mishap. *b* (1) The blood is more fluid; (2) the clotting time is delayed; (3) complement disappears; (4) many of the colloidal particles go into solution.

The "Cardiorespiratory Syndrome" in Subacute and Latent Infantile Scurvy. Alfred F. Hess's "new sign" is in itself an important contribution to semiology; but his latest paper,¹ devoted to its description, sums up (with references) a far-reaching clinical study, conducted since 1914, of the fundamental principles in infantile symptomatology, pathology, and diet. The practical significance of that work extends far beyond the special range of pediatrics. Sound infantile nutrition is the corner-stone of individual soundness, and of all its future growth and stability. The elementary canons for that euthrepia point out with unerring simplicity the main lines of physiological nutritional rectitude for the whole life. "Subacute and latent infantile scurvy" is an illuminating heading. Like all products of misdirection and mismanagement, its workings are insidious; and its evils are larval at first and long latent, until they become subacute, and finally break into acuteness for our belated recognition. The starting-point is the drying up of nature's fountain of life, and the substitution of an "inequivalent" for mother's milk. Pasteurization, as a clause of safety, proceeds to denature the substituted foreign supply. It eliminates a "something," which, from the characters of the ultimate resulting symptoms and of the successful remedy, we have learned to identify as an "antiscorbutic" value. The most common and disastrous subsequent defect in our puerile and in our adult dietary is that self-same want. But its demonstrative test is no longer "scurvy," which is a comparatively rapid and specially infantile reaction, but a long series of mysterious symptoms of athrepia in the less robust, taking many years to evolve into the declared complex, partly functional but ultimately structural also, which, for want of a perception of its fundamental etiology, still goes under the broad designation of "high tension arthritis" a most cryptic disguise for a definite and substantial nutritional miscarriage. It is true that many infants do not reveal to us the larval evil silently at work within them, though all alike are in some degree potential candidates for scurvy. Hess reminds us that we should guess it, and supply them in advance with their "antiscorbutic" in the shape of fruit,

¹ Journal of American Medical Association, January 17, 1917.

or better still, as he has shown, of earth's ground-grown vegetables. That beneficent teaching extends to the essential need of all subsequent dietaries, not less than to the initial protection of the steadily growing group of constitutionally predisposed candidates for arthritism, whom we are still unmindful of identifying at the early propitious time as juvenile "constitutional arthritis." Their blood is the channel of the mischief not through thinning, but through overcharge and inspissation. Their remedy is a steady supply from nature's abundant but neglected offer of the vegetable antiscorbutics.

These incidental remarks on some of the wider bearings of this suggestive paper may serve as an additional inducement to peruse it carefully for the sake of its specially pediatric theme. They have been more definitely suggested by its concluding statement that the nervous

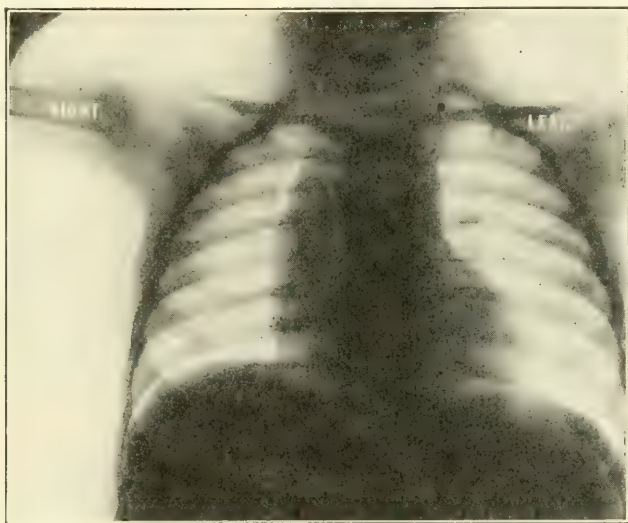


FIG. 9.—Enlargement of heart, especially to the right, and broad shadow at the site of the large vessels.

system is extensively involved in infantile scurvy, which may thus be brought into parallel with other "deficiency diseases" such as adult scurvy, beriberi, and pellagra. The evidence for that nervous implication is yielded by the changes in the optic disk, by the increase in the knee reflexes, but in a special degree by the "cardiorespiratory syndrome" our main objective in this report, which Hess attributes to an involvement of the nerves, and presumably to their faulty nutrition, as its symptoms are rapidly amenable to the administration of orange juice or of potato.

The essential symptoms of the syndrome are two: A very rapid pulse, and a respiratory frequency which may rise to 60 per minute. He applies to the latter the term "polypnea," without, however, stating whether or not the total ventilation coefficient of respiration is increased as a result of that accelerated rate or "tachypnea."

The characteristic physical signs of the syndrome are also two, apart from the classical changes usually described in declared infantile scurvy. They are strikingly illustrated in the skiagram. But it is stated that neither of them is invariably present; and that they should not therefore be regarded as reliable for a diagnosis, and particularly for an early one. In the first place, the heart shadow is enlarged, especially to the right. This dilatation had been previously described, in the literature of the affection, as liable to occur in association with dulness and diminished breathing at the pulmonary bases. The other sign does not appear to have been recorded. It consists in an unusual broadening of the supracardiac or prevascular dulness, at the site of the great vessels. The precise nature of the changes in the upper mediastinum is not discussed; but it may be fairly assumed that a dilatation of the superior vena cava may be included in them, together with some enlargement of the thymus.

Recovery from Delayed Chloroform Poisoning by Intravenous Sodium Bicarbonate Injection. G. G. Farquhar¹ reports the case of a soldier convalescent from "gassing" who was operated for gangrenous appendicitis, developed sleepiness and slight jaundice on the second day and profound coma on the third; but the initial dyspnea, with rapid, weak pulse noted in fatal cases, was not present. The treatment advocated by Langdon Brown in diabetic coma was applied. A massive injection of 5 drams of the bicarbonate in 2 pints of sterile water produced a slight temporary rally; and was followed up by subcutaneous infusions of 1 pint every six hours and occasional rectal injections of the same solution. After two days a definite return of some consciousness was observed, and on the third mentality was normal. The subsequent recovery from a condition which had seemed to be hopeless was complete and uneventful, but for a septic abscess from one of the punctures.

The Treatment of Hydrocyanic Acid Poisoning. Vermin destruction by HCN fumes, evolved from a dish by adding some KCN to measured amounts of H_2SO_4 and water, is largely practised in India, South Africa, and the United States. B. Coher² relates 2 cases. The symptoms were unconsciousness, deep pink suffusion, and extreme slowness of breathing. In the first case artificial respiration after a while brought up some froth; the dilated pupils contracted, and the conjunctival reflex returned. But three secondary attacks followed. The first was convulsive, ending in rigidity, with very weak pulse. The second was similar but more severe. In the third, the convulsive rigidity was such as to raise the body from the floor. The pulse was then almost imperceptible and the respirations were shallow. The face grew ashen gray, and the patient appeared to be dying of heart failure. He was made to inhale aromatic ammonia, and $\frac{1}{500}$ grain of strophanthin was injected subcutaneously. Within a few minutes he improved, and in fourteen hours, after a good sleep, he had recovered. The second patient, seen after twenty minutes, had lost control of his legs; his face was suffused pink, there were general tremors,

¹ British Medical Journal, April 28, 1917.

² S. A. f. Med. Rec., February 12, 1916.

pulse thready and 140 to the minute, respirations deep; but he was quite conscious. Along with the flushings, the patient had a sense of impending dissolution and a burning sensation in the eyes. The injection of strophanthin quieted the pulse. The manner in which the poison kills is not definitely decided. The pink color of the face and the practical cessation of respiration suggest that prussic acid limits or prevents internal respiration. The tissues are prevented from using their oxygen and giving up their carbon dioxide. The proper treatment is artificial respiration; not only to maintain respiration, but also to eliminate the hydrocyanic acid by the lungs. The convulsions and rigidity would throw an undue strain on the large veins and on the right side of the heart, as was shown by the slow and weak pulse, and by the immediate improvement after the administration of strophanthin. Venesection was formerly recommended for this condition; but probably the right heart might be equally eased, and contractility stimulated, by vigorous artificial respiration.

The Novel Danger from Trinitrotoluene has been partly met by new rules issued under the Defence of the Realm Regulations. They include, in addition to scrupulous cleanliness, various means for minimizing the contamination of the outside of articles during the process of filling; all floors, work-benches, trolleys, fittings, or appliances on which trinitrotoluene may accumulate must be cleaned by an approved method; no oil or grease or other carbon compounds which are solvents of trinitrotoluene shall be used in any place in which any trinitrotoluene process is carried on, unless such use has been approved. No person under sixteen years of age shall be employed, nor any person employed continuously for more than a fortnight at a process involving contact with trinitrotoluene.

BLOODVESSELS AND BLOOD-PRESSURE.

Congenital Obliteration of the Aorta is not incompatible with life, as demonstrated by H. Grauss¹ case in which its existence was discovered in the postmortem room. The coronary arteries opened into the left ventricular cavity by a common orifice near the site of the aorta, close to the interventricular septum. The ductus arteriosus and the foramen ovale were widely patent. The heart was slightly enlarged. The apex was made up of the right ventricle, which was appreciably larger than the left. The pulmonary artery was considerably larger than the aorta. From the ventricular cavity there was no opening into the aorta; but at the site of the aorta there was a small pin-point retraction of the endocardium, and there was no evidence of any aortic valves. The aorta was completely closed for a distance of 2 cm.; it dilated to its normal diameter at the junction of the ductus arteriosus.

Cases of Congenital Structural Heart Defects are described by L. Findlay and W. B. M. Martin.² The necropsies recorded the following

¹ American Journal of Diseases of Children, 1916, p. 606.

² Glasgow Medical Journal, lxxxvi, 1, 2 and 3.

conditions. In a case of patent foramen ovale: Hypoplasia of eyes with corneal opacity, coloboma and congenital cataract, ventral hernia, fetal lobulation of spleen and kidneys, catarrhal bronchitis with early pneumococcic bronchopneumonia, collapse of lung and slight compensatory emphysema, and venous congestion of organs. In a case of defect of intraventricular septum at pars membranacea: Normal great arterial trunks, closed foramen ovale and obliterated ductus arteriosus, partial collapse of lungs, with early streptococcal bronchopneumonia. In a case of congenital stenosis of the pulmonary tract with atresia of the orifice: Incomplete interventricular septum, patent ductus arteriosus, and patent foramen ovale, extensive pneumococcic bronchopneumonia with venous congestion of the organs; death at the age of three months. In another case of congenital stenosis of the pulmonary artery: Defect of intraventricular septum at pars membranacea, widely patent foramen ovale and duplication of vena cava superior, partial atelectasis with emphysema and congestion of the lungs; death at the age of two months. The last case was one of congenital syphilis with patent foramen ovale and ductus arteriosus, and venous congestion of organs. The child was one month old.

Intermittence of the Murmur from Patent Ductus Arteriosus, in two girls aged ten and seventeen years, is recorded by Forschbach and Koloczek¹ as occurring during prolonged inspiration, and during the Valsalva experiment which also produces a flattening of the second arc of the heart's x-ray shadow. They take this to indicate a reduction in the caliber due to the increased pulmonary alveolar expansion. Might it not perhaps be the effect of a lowered arterial pressure resulting from a diminishing right auricular blood supply from the great veins during the held breath?

Successful Direct Massage of a Thrombosed Brachial Artery through an Incision. J. A. Caldwell's² intention in operating was thrombectomy; but this proved unnecessary. A few firm strokes of the finger in a proximal direction over the exposed artery restored the absent pulsation at the wrist. Presumably the soft clot has been broken up, and was washed down without completely blocking either radial or ulnar. This occurred four years ago, and is now reported by him as a complete recovery, and as the happy result of an unusual procedure.

Migrations of Projectiles in the Circulation. The *Epitome of the British Medical Journal* for February 17, 1917, contains a report of Grand-gérard's case in which a missile migrated from the heart to the pelvis. That for April 7, gives full details of V. Ascoli's case in which, on July 18, 1915, a shell fragment entering from the back lodged in the common iliac vein or the inferior cava (where it was seen on August 1, under the x-rays). On September 1 it had disappeared, but was identified in the right auricle, where it oscillated regularly through 2 or 3 cm. with each beat, but was, in addition, "whirled" by each deep inspiration, whether in the erect or in the recumbent posture. Surgical recovery was completed in December, without any respiratory or circulatory symptoms,

¹ München. med. Wchnschr., November 19, 1916.

² Journal of American Medical Association, October 28, 1916.

except some slowing of the pulse. Yet precisely the same appearances were seen on the last inspection recorded in the paper, namely that of July 10, 1916; and the heart's shadow was quite normal. Surgical intervention was not therefore deemed advisable.

The same Epitome analyzes Achille Monti's report (with a bibliography of 70 operations for gunshot wound of the heart) of his important experimental investigation, in large dogs, on the behavior of pellets of lead, introduced into the veins (common iliac, or jugular), under the influence of posture, etc. Some lodged in the auricle; others passed into the lung along branches of the pulmonary artery. One dog with the latter condition was able to hunt as well as before. The heart is not more intolerant of foreign bodies than other viscera. Postmortem, in dogs (and presumably in man), spherical bullets can be made to reach the right auricle, but not beyond; probably because of the Eustachian valve and of the tricuspid flaps. Much additional information is contained in the original paper.

Blood-pressure Estimation. Some of the autocratic dicta in Sir J. Mackenzie's latest work have given a shock to American reviewers. Perhaps the most important of them is the allotment of a secondary importance to the instrumental clinical observation of blood-pressure. Coming from a chief apostle of instrumentation for heart study, this can hardly be dismissed as a random utterance. Much less is it likely that the reading of the peripheral circulation should have been held barren of any diagnostic significance. As it strikes us, the practical value of pulse observation is so great that it needs the finest of all testings, that of the *tactus eruditus* with which no instrument can compete. The fingers are unfortunately not taught their work; partly owing to manometric preoccupations. Alone, the touch can give us the living physiology and the anatomy of the artery. Those are the essential data. No rigid instrument doing violence to the circulation can estimate them for us, however minute its report as to the millimeters of blood-pressure. Clinical time is limited: the behavior of the artery, which is more vital than the blood-pressure, should be tested first. Let us learn, that we may teach our students, how this can be done. That study will render us reliable judges, for practical purposes, of "undue pressures" both systolic and diastolic. Above all let us not risk *propter instrumentum, instrumenti perdere causas*.

Great Differences in the Diastolic Pressure of Different Arteries and Arterial Levels are reported by J. Hertz.¹ They point to the necessity of recording with each determination a specification of the particular artery and of its site.

The Plethysmographic Study of the Volume and of the Form of the Peripheral Pulse in the Forearm. The chief comment we would offer on A. W. Hewlett's² contribution bears upon the significance of the pointed type of tracing which he attributes to a "backward reflection" of the systolic wave. The elucidation of the nature and of the graphic shape of the pulse has been much retarded by the prevalent confusion between

¹ Arch. d. mal. du cœur, September, 1916.

² Journal of American Medical Association, October 14, 1916.

two fundamental quantities—the lightning systolic wave, and the much slower blood flow. In tachycardia the radial artery cannot receive its quantum of the actual ventricular blood until two or more subsequent systolic waves have struck it, and have partly rebounded from its wall. That blood encounters rebounds from pressure marks at every point in its journey. These do not delay it; much less do they produce any “registrable” retrogressive wave. It is also elementary that normally the arterial blood-flow is likewise steadily “onward.” The blood may be otherwise delayed in its progress; but it cannot stop. And much less can its flow be reversed, as this happens in some of the loops of any capillary network. A back-flow can occur only into the heart, and only from the root of the aorta, if this should not be properly valved. The partial delay of each ventricular output and the “gradual” charging of each peripheral artery by it are therefore essential features of the normal circulation. The working factors in that indispensable mechanism are the elastic distensibility of the aorta and of its main trunks; and their elastic recoil which starts, at the aortic notch, a second “registrable” wave of pressure down the peripheral distributing arterial tree. On that basis alone can the problems of the peripheral pulse be profitably studied and discussed.

THE PERICARDIUM AND THE HEART.

“Artificial Pneumopericardium” for the Cure of Tuberculous Pericarditis with Effusion is recommended for further trial by P. E. Weil and Loiseau¹ on the strength of their successful practice of it without any resulting pain, dyspnea, or cardiac symptoms, because the injected air (which was not submitted to any special filtration) was carefully supplied in volume equivalent to that of the fluid withdrawn, under supervision by means of the x-rays. The effects aimed at and obtained were the gradual conversion of a pathological into a serous effusion, the release of any yielding adhesions, and the prevention of any permanent agglutination of the membranes. As no other treatment was adopted except daily exposures of the thorax and abdomen to sunlight (from five minutes gradually up to a maximum of forty), we may endorse the general conclusion that the credit for the recovery belongs to the action of simple atmospheric air, brought into direct contact with the disease at its seat. We might also note that the mechanical conditions of this air treatment are *sui generis*, as compared with artificial pneumothorax. The pericardial air charge is kept in a perpetual forcible circulation quite unparalleled by that of the pleural air charge. In the case which they detail of a patient, aged fourteen, five treatments were given at lengthening intervals of eight, fifteen, thirty-three, and forty-eight days, in keeping with the progressive improvement.

In comparing this procedure, with its analogous applications in other situations, the therapeutic agent seems to be here the direct curative value of the air, not merely its substitution as an adjuvant to the cure.

¹ Presse méd., December 28, 1916.

In our progressive era of cardiac surgery, this might tend to settle in the negative the question whether the future treatment of tuberculous and suppurative pericarditis should be by some "open" operation.

The authors' technic, in harmony with those unique local conditions, differs (1) from that of *artificial pneumothorax*, where air is injected, usually without any preliminary removal of fluid; (2) from that of *pleural paracentesis with air substitution* where fluid escapes before any air begins to enter; and (3) from that of *artificial pneumocephalus* (which the writer seems to have been alone in resorting to for advanced chronic hydrocephalus), which is strictly substitutional, the fluid outflow being entirely dependent upon an automatic supply of air (through a separate canula) by the agency of atmospheric pressure: and this method is still open to further elaboration by the judicious application of some external elastic pressure to the head during its emptying of fluid. For the evacuation of the pericardial effusion that elastic pressure is already on supply from the reëxpanding lungs. Weil and Loiseleur avail themselves of it to "drain" the pericardium first; and they inject the air afterward. That method *à deux temps* lacks the automatic precision and safety of the "atmospheric" substitution; but it spares the heart the added risk of a second canula which is needed in artificial pneumocephalus. As a fact it is not optional. The heart's action and respiration can expel the fluid: they cannot provide the equivalent recharge of air, which is needed for efficacy. For this some slight injunctive pressure is indispensable.

The Physiological Mechanism of Cardiac Dilatation. A. V. Hill had demonstrated that the energy developed by a muscle is directly proportional to its previous stretching. Starling pointed out the bearing of that fact upon our cardiomechanics: Any increase in heart work necessitates an extra degree of diastolic stretching to supply the extra energy. In health the apex beat, temporarily displaced by exertion, will soon return to its normal site. If, however, the contractility should be reduced by disease, even the maximum stretch may fail to supply the required energy; and the heart will then remain dilated. Langdon Brown in his paper on "Soldier's Heart" in the *Lancet*, bases upon those views a statement that the heart is least of all tolerant of any shortage in its diastolic charge. This will tend to stop its action; and actually stops it for instance in persons squeezed to death in a crowd. They die from syncope, not from asphyxia. Their chest failing to expand does not suck up the indispensable diastolic charge into the right auricle. Likewise, he regards the venous "back pressure" as a means to stretching, and thus stimulating to greater effort, an inefficient auricle. In the case of the left ventricle, the peripheral arteriolar contraction is the means to raising the blood-pressure, through dilating and stimulating the myocardium. On the other hand, as he was the first to point out, a raised arterial pressure drives more blood into the coronary arteries (which have no vasoconstrictor nerves) at the time when blood is most needed by the heart muscle for its extra work.

Auricular Venous Pulsation in the Liver; and Gallop Rhythm. "Bruit de galop" is a correct term in French only; in English it should be

"cantering rhythm," *viz.*, the three-beat rhythm of the French "petit galop" (the "grand galop," our galloping, having only two). C. Pezzi¹ reviews the whole subject of hepatic pulsation, which had been first described by Friedreich fifty years ago, on the basis of his own study of 7 clinical cases. He concludes that both the auricles and both the ventricles contribute to the production of that rhythm. He points out that a cantering rhythm of the heart is generally due to exaggerated activity of the auricles, which contract with undue violence and distend the hypotonic ventricles with blood so suddenly as to give rise to a perceptible cardiac sound; and the recent work of Offenbacher (1914) on this point is quoted. He believes that an auricular or presystolic pulsation in the "liver" is commonly present in cases of congenital heart disease affecting the right side of the heart, with or without tricuspid stenosis. But in cases of cantering rhythm, a stenosis of the tricuspid valve can be excluded on *a priori* grounds. The first of his cases had cardiac murmurs of mitral incompetence and stenosis, and the diastolic Graham Steell murmur of relative pulmonary incompetence. The presence of the auricular pulsation in the liver was taken to prove that the tricuspid valve also was stenosed; and this diagnosis was confirmed at the autopsy.

Studies in Auricular Contraction have been published by Niles and Wiggers,² and by G. Bachmann.³ Niles and Wiggers, in addition to their photographic study of the venous pulse in auricular fibrillation, establish in a separate paper that the large recurrent waves of the venous pulse are merely related to the size of the auricular mechanical contractions, and possess no differential value.

Bachmann concludes from his investigation that the "onset" of the right and the left auricular contraction is not synchronous, the precedence of the right averaging 0.013 second. The chief path of conduction seems to be the interauricular band, as its crushing causes a delay of from 3 to 4.6 times the normal average. It is significant of its relatively inferior importance, as compared with that of the auriculo-ventricular band, that the crushing does not produce any genuine block.

Extreme Prolongation of the Conduction Time in the Bundle of His from Digitalis Therapy. The practical teaching from a case fully reported by Lewellys F. Barker and E. W. Bridgman⁴ "as probably the most extreme on record," is that, while in the vast majority digitalis produces no untoward effects, possibly because of the fact that a "functional" impairment of the bundle is rare, there is a small number in whom real harm may result. In the bearers of early or advanced coronary sclerosis there is, in addition, more or less general arterial disease with the possibility of renal or cerebral, as well as of myocardial, degeneration, or of a liability to peripheral vasomotor crises. The immediate danger arises from the circumstance that the nutrition and the function of the bundle are dependent upon its blood supply from a

¹ Policlinico, 1916, xxiii.

² Journal of Experimental Medicine, 1917, No. 1.

³ American Journal of Physiology, 1916, xli, No. 3.

⁴ Journal of American Medical Association, March 24, 1917.

terminal artery. The degree of its inefficiency can only be estimated by the polygraphic or, preferably, the electrocardiographic method; and best, whenever possible, from their joint tracings. In this way, Thayer has been able to record the occurrence of a P—R interval of 0.88 second and of an a—c interval of 0.97 second. The authors' tracings display delays in the atrioventricular conduction ranging from 0.23 to 1.03 second. The atrial rate was fairly regular at 65; the less constant ventricular averaged 50 per minute. The patient, a farmer, aged sixty, was much improved by the suspension of the digitalis and by a three weeks' treatment by rest, light diet, and general massage.

Complete Heart-block after a Shell-wound of the Heart; with Fragment Embedded in the Anterior Wall of the Right Ventricle. C. Edgar Lea¹ gives a brief account of this unique case, with illustrations. On December 16, he first saw the patient, aged twenty years, who had been wounded on July 1. The question for discussion was as to any attempt at extraction. This was decided in the negative as soon as an arrhythmia was discovered, with entire independence of the ventricular and auricular rhythms (the ventricular rate being 40 and quite regular; the auricular,

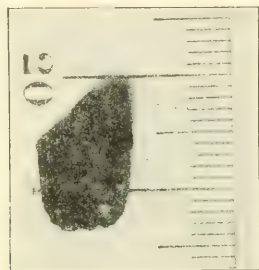


FIG. 10.—The shell fragment carried by the blood stream from the right femoral vein to the right ventricle.

96). In addition, there was enlargement of the heart, associated with an apical systolic murmur and with some dyspnea on exertion. The patient had to be discharged unrelieved, as atropine had no effect. He has not been heard of since. The fragment which moved in an upward direction with each systole, was localized by the x-rays as immediately above the level of the diaphragm and just half-way between the midsternal line and the apex of the left ventricle, and, in Lea's opinion, at a distance from the bundle of His. He suggests that the mechanical impact might have determined a small hemorrhage in which the bundle might have been implicated.

In the case reported by H. M. Lyle² a rough shell fragment weighing 81.1 grams, and of the shape and measurement shown, had penetrated the right femoral vein. But it was found in the right ventricle, still bearing some fibers of clothing. The wound in the thigh remained aseptic under Carrel's method; but the patient died on the fifth day

¹ Lancet, March 31, 1917.

² Journal of American Medical Association, February 17, 1917.

from pericarditis and pneumonia, with generalized emphysema from gas-bacillus infection.

Bradycardia: "Myocardial," or "Nervous." II. Frédéricq¹ agrees with Wenckebach in rejecting the common assumption that acceleration by atropine or amyl nitrite proves a nervous, and non-acceleration, a myocardial origin. In dogs, without interfering with the nerve control, he can produce by moderate compression of the region of the bundle, a slow pulse similar to the clinical, permanent, slow pulse from dissociated auricle and ventricle action. But the ventricle beat can then be accelerated by severing the vagus, or by paralyzing it with atropine or amyl nitrite. Therefore a nervous origin cannot be argued merely from an acceleration induced by that drug test.

The Oculocardiac Reflex. An *Ophthalmic Compressor* has been devised by G. Roubinovitch,² which is easily adjustable to any degree of pressure, and affords greater safety and precision than digital compression. In his demonstration before the Académie des Sciences, he referred to the physiological effects of pressure on the eyeballs. This, under normal conditions, causes a slowing of from 4 to 10 beats a minute in the pulse-rate. But in various pathological conditions it may produce either a more pronounced slowing; an absence of slowing; or an actual acceleration, especially in nervous affections such as epilepsy.

Chronic Tachycardia; and Its Treatment. In both those aspects the clinical history of a man, aged fifty years, narrated by E. W. J. Vinnis³ is of singular interest. It shows that an inveterate tachycardia, based upon a chronic regular "tachyatria" (about 2 to 1), can be permanently brought down to a normal atrioventricular rhythm of 65 or 85 per minute by a special and intensive method of digitalis administration. It also proves: (1) that a heart can beat at 140 for three years without permanent damage; (2) that an auricular beat of 280 need cause no subjective disturbance; and (3) that, when the ventricular rate has subsided into a normal range, the persistent absence of "chronotropic nervous influences" may not even then be felt. There was an early history of rheumatic fever and of syphilis without heart lesions; and a "nervous" etiology was diagnosed. The general appearance was healthy in spite of some cyanosis, dyspnea, and low blood-pressure. Vinnis applied successfully his method, already successful in about half his previous trials of it, which aims at forcing the regular tachyatria into fibrillation; and then at a complete restoration to normal action by abruptly suspending the digitalis. Daily doses of 400 mg. of pulverized digitalis caused irregular pulse without actual fibrillation, but upset the stomach and had to be stopped for a while. Digitalis was again administered up to 150 mg.; and in a few days the ventricle was beating 70 with improvement of all the symptoms, although the auricle was still beating 280 (4 to 1). The dose was then reduced to 120 mg. While under this, emotional stress induced several transient attacks of the 140 rate, (2 to 1), at lengthening intervals. During a final one, more lasting and severe, the digitalis was abruptly stopped;

¹ Arch. d. méd. du cœur, September, 1916.

² Presse Méd., August 10, 1916.

³ Nederl. Tijdschrift. f. G., January 6, 1917.

and the heart settled down, and has stuck for a year to a normal action from 65 to 85. A special feature in the case was the insensitiveness to the fourfold hurry of the auricle. When this first set in, the patient had imagined he was already cured.

An **Attenuated or Latent "Myocarditic Syndrome"** is described by Nobécourt and Peyre¹ in cases of "cervicosciatic rheumatism" as observed in soldiers who had been first suspected of cerebrospinal meningitis. The heart was found to be enlarged; but it soon recuperated after rest in the hospital, and convalescent leave.

The Streptococcus Viridans, according to the experimental and cultural research in rabbits by H. K. Detweiler and W. L. Robinson, of Toronto, has a special predilection for the heart and joints analogous to that of the pneumococcus for the lungs, etc., with a great variability in infectivity. (1) The cocci which were isolated from the blood of chronic infectious endocarditis were of very low virulence, probably lower than that of any others hitherto recovered from a similar source. (2) These streptococci are capable of producing in animals lesions identical to those found in the patients from whose blood the organisms were obtained. (3) The strains of *Streptococcus viridans* isolated from the mouth of normal individuals are similar to those isolated from the blood of patients suffering from chronic endocarditis, and are equally capable of producing heart lesions in the rabbit.

The Estimation of Myocardial Efficiency by J. Strickland Goodall² is based upon 2000 observations on healthy and diseased hearts during the last five years, as regards their "work reactions." (a) The average "normal heart" increases its frequency gradually. (b) The slow "super-heart" of the trained athlete can almost double its rate suddenly. (c) Any impaired myocardium will quicken out of all proportion to the work attempted: and it responds by dilatation instead of increased contraction, and also by various rhythm irregularities, and often by audible murmurs. Two observers are needed: One for the blood pressure (armlet kept on; and manometer a fixture on the wall); the other for the pulse and respiration records. In good heart-efficiency, normal rates for all three should be restored within three minutes on the couch. Of the graduated tests used by Goodall, the most severe are timed running upstairs, and serial weight liftings; the mildest is the (likewise timed) walking up an inclined plane (1 in 8). The "progressive exercise" testing is the most important as a guide to treatment. It enables him to determine, from the onset of heart distress symptoms, the heart reserve and endurance.

For treatment, it is essential (1) that the increase shall be gradual, the prescribed work being done once, twice, or three times daily; (2) that it shall be systematic; and (3) that plenty of rest shall be ensured between the exercises. It is a responsible undertaking; quite satisfactory if judicious; but only safe with a full knowledge of what the heart can do and how it is done.

¹ Paris méd., December 23, 1916.

² British Medical Journal, October 14, 1916.

The Usefulness of Bock's Stethoscope in Clinical Practice is praised by Capt. Jeffrey Ramsay¹ in confirmation of O. Leyton's advocacy of it. He has found it most efficient in dealing with the "irritable" soldier's heart; and in confirming in other cases the existence, and the significance of varied signs of myocardial weakness.

The Cardiac Rhythm in Soldiers in Active Service. Léon Binet² makes the following statements. Soldiers after arduous temporary exertions may present (1) a state of asystole with unaccountable, thready pulse, possibly soon followed by death; (2) paroxysmal tachycardia, easily relieved by the swallowing of a large bolus of dry bread, or by exerting pressure on the eyeball; or, (3) a condition of heart insufficiency with marked arrhythmia and tachycardia, due primarily to insolation. After physical overwork lasting several days, perhaps with sleepless nights, a different condition is observed. A resting regiment examined in January, 1916, showed 6 per cent. of men with a pulse below 70. But an examination of 100 men after a very active period, during which these men had had to fight day and night and execute other arduous tasks, showed 56 men with a pulse below 70, including 20 with pulse at 55 or lower. The existence of a fatigue bradycardia is thus demonstrated. But the temperature, in spite of a pulse-rate of 60 or 65 was sometimes above the normal, *viz.*, 38° or 38.5° C.

The Soldier's Heart or Irritable Heart is an old evil. It was not suppressed either in 1864 by the reform in the military accoutrement, or in 1876 by that in the "setting-up drill." Three fresh views of its causation have been offered recently: That it is partly toxic; that it is purely neurasthenic; or that it is due to some perversion of the internal secretions. Langdon Brown states, in his recent paper in the *Lancet*, that all three factors may operate, either separately or in combination. Sir James Mackenzie holds the view that 90 per cent. are not primary heart cases, but due to strain supervening upon some intercurrent infection. Others have blamed tobacco. Langdon Brown is convinced that the sufferers are neurasthenic; but he is not convinced that the cardiac condition is entirely due to neurasthenia. The vascular system may have been their weak spot. Indeed Rudolph found that the majority of his patients had shown vasomotor instability for years. The nervous theory is not incompatible with the internal secretion theory. The suprarenals and the thyroid have both been suspected. Adrenalin is recognized to be the hormone of the sympathetic nervous system. If its supply should be exhausted from excessive stimulation the result would be loss of tone of the entire sympathetic system. Again, as some diseases, such as diphtheria, diminish the chromaffin material in the suprarenals, we may infer that its exhaustion might be hastened by any previous infective conditions. The hyperthyroidism theory has been pushed forward of late on the strength of cases where the gland had enlarged, and where its size and the symptoms were lessened by x-ray treatment: it deserves careful consideration. In most cases, however, there is no definite thyroid enlargement; and a plausible theory has

¹ British Medical Journal, October 14, 1916.

² Presse méd., August 10, 1916.

been advanced that the normal balance is disturbed between the supra-renal and the thyroid secretions. Further examinations of the blood will be needed to determine the amount of adrenalin and of sugar in the circulation. A research has been started by Thomas Lewis, on the cardiac effects of a diminution in the supply of the "buffer" salts of the blood, namely the sodium bicarbonate and the phosphate, the name implying that, because they fix a good deal of the CO_2 , they ease the shock of the reactions caused by the fluctuations of acid or alkali in the blood. He has found that a deficient supply of those salts produces great fatigue, giddiness, tachycardia, and tachypnea. This suggests that an alteration in the salt metabolism might account for the symptoms; and that the irritable heart's condition might be due to a disturbed balance between the internal secretions—particularly as the thyroid is believed to play a part in the fixation of salts in the tissues. The investigation which is in progress may eventually solve this difficult problem.

Cardiac Symptoms in Recruits and Soldiers. Captain W. Scarisbrick¹ gives a practical clinical classification of the cardiac affections observed in a series of 218 soldiers and 151 recruits, on the basis of the general symptoms, signs, and previous history both general and clinical. His five groups include cases of (1) organic valvular disease (88); (2) myocardial disease (34); (3) strained heart (58); (4) cardiac neurosis (32); and (5) cardiac disability alleged but not found (6). Most of the *valvular* cases had a history of rheumatic fever; and the others of scarlet fever, pneumonia, chorea, or influenza. Their percentage was the same among soldiers and recruits. None of the *myocardial* subjects had had rheumatic fever; but some, chronic rheumatism, or alcoholism, or one of the common acute infections. They were thin, pale and weak, short-winded; with palpitations or flutterings, disturbed sleep or nocturnal dyspnea, and incapacity for any exertion which produced an increase in their enlarged cardiac dulness. The pulse was quickened and often irregular. A mitral murmur was heard, and frequently, too, a soft bruit in the aortic region; and sometimes premature systoles. A moderate degree of arteriosclerosis was noted in many of them. The percentage was 21.8 among the recruits, and 15.6 only among the soldiers.

The borderline between strained heart and neurosis is very uncertain; but "neurotic" group contrasts with the other in the absence of permanent dilatation and of pulse abnormality. The heart sounds were good; the mitral murmur was slight and sometimes distinctly identified as a reduplication; and a pulmonary murmur was heard in some cases. It was noted that any premature systoles were apt to disappear after exercise. Most of the subjects were of good muscular build and had not had rheumatism or any of the specific fevers. Several of the soldiers had been "gassed" at the front. The percentage of the neurotic group was 58 per cent. among the soldiers, and 15.2 per cent. among the recruits. Two clinical types of cardiac neurosis were met with: (a) Those in which the cardiac sounds were weak, irregular, and rather rapid, a soft systolic

¹ British Medical Journal, February 24, 1917.

bruit usually accompanying the first sound at the apex; the patient was poorly developed and showed general nervousness; (b) those in which the cardiac sounds were exaggerated in muscular tone, and the only other abnormal sign present was tachycardia. After exercise both types showed a marked increase in the rate of cardiac contraction, but no dilatation or increased cardiac dullness. As in the civilian cases of "irritable heart," the underlying cause cannot always be traced. In several cases, both soldiers and recruits, excessive tobacco-smoking was certainly the cause of the trouble; while in others slight enlargement of the thyroid, accompanied by signs of hyperthyroidism, accounted for the neurosis; and in several instances drug-taking was suspected, and in 3 cases admitted. The percentage was 14.7 among the soldiers and 17.9 among the recruits. The underlying cause could not be traced in 22 of the 32 soldiers, nor in 10 of the 27 recruits. Enlarged thyroid was found in 10 recruits but only in 6 soldiers. Tobacco heart was diagnosed four times in both sets. The cases classified in the final group comprised the malingerers, and one or two cases with cardiorespiratory murmurs. Many men who thought they had a weak heart, but who were found to be perfectly normal, are not included. The percentage of this group was 2.7 among the soldiers and 6 among the recruits. Scarisbrick believes that this "grouping," if carried out carefully and systematically, should prove of material value: (a) in helping to form a decision as to what kind of treatment, if any, should be adopted in a particular case; and (b) in determining the category of military utility for any particular man.

The "Soldier's Heart" and the "Effort Syndrome." A General Report of the Medical Research Committee appointed in 1916 to investigate at the Mount Vernon Hospital cases invalided under the headings of "Disordered Action of the Heart" (D. A. H.) and of "Valvular Disease of the Heart" (V. D. H.) has been framed and presented by Thomas Lewis as the whole-time director of the work. A preliminary test by graduated exercise was first instituted to sort out those who could pass the test from those who failed to pass it, and who displayed the symptoms which he describes as the "effort syndrome." Some of the latter presented no physical evidence of cardiac abnormality; while some of the former were not free from enlargement, from irregular action, or from valvular murmurs. After treatment, about 50 per cent. of all the patients were returned for service; and about half of that number were fit for full service. The working principle was to raise their spirits, and to encourage them to regard themselves as convalescents, by minimizing the bed stage, and by furnishing them with occupations and with interests. The criterion of fitness is the behavior of the pulse-rate after exertion. A fairly constant fall indicates cardiac adequacy; but in most of the "effort syndrome" cases it takes five times longer to establish that reduction. Concerning digitalis, a definite conclusion was arrived at from clinical observations which included estimations of the size of the heart, and pulse and blood-pressure determinations, that no perceptible result whatever followed its administration. No positive "dilatation" was registered in the entire series; though the "effort syndrome" cases were slow to yield under graduated exercises the shrinkage in cardiac

diameter which averaged 1 cm. observed in the others. Another conclusion, and perhaps clinically the most important, was that the presence of a systolic murmur, whatever its site might be or the degree and the range of its audibility, proved to be incompatible with a recovery of general and of cardiac efficiency. The electrocardiograph has not hitherto proved of practical service in aiding the diagnosis or the prognosis. Etiologically, it was recognized that nervous stress was prominent in a large proportion of cases, but that the main factor in the production of the syndrome was the unaccustomed physical strain thrown upon the heart by the preliminary training or in the fighting line, in individuals previously addicted to sedentary occupations exclusively.

Loose Bullets and Foreign Bodies in the Heart. Arthur Keith, writing to the *British Medical Journal*, from the Museum of the Royal College of Surgeons, where S. G. Shattock and Cecil Beadles have been helping him to collect a series of war specimens now amounting to more than 1200, recommends to military surgeons a systematic search of the great veins for the site of entry, when bullets have entered the venous circulation, and also for the reason why sometimes no noticeable hemorrhage results. He has seen records of at least 8 cases of bullet in the heart. In every case the bullet is coated with fibrin. Col. H. M. W. Gray removed one from the right ventricle; and the patient's death four days later was not due to the operation. It is remarkable that there is no case on record of a bullet being carried into the pulmonary artery. When the bullet is loose in the right auricle or ventricle it might be possible, as in Grandgérard's case, to bring it by posture into some more accessible part of the body. That bullet had first been seen in the auricular region. It was afterward localized in the right groin; and finally over the base of the sacrum; showing that a bullet can be swept with, or can gravitate against, the venous current. In three specimens in the Museum the heart shows no trace of a wound: Grandgérard's observation has supplied their explanation by demonstrating the unsuspected intravenous migration of foreign bodies. We had hitherto attributed that migratory tendency exclusively to venous thrombi.

Treatment. THE PREVENTION AND RELIEF OF HEART DISEASE has long been a crying national need, strangely neglected. The prevention of cardiac cripplement is the first of our duties. The profession cannot be exonerated from a signal failure in the past, and from a still prevailing supineness in any systematic search for some direct protective remedy at the onset of rheumatic fever which is the chief of our heart-disabling affections. Much more is now being done to obviate the syphilitic danger. Meanwhile, all the greater is our sympathy with the generous efforts of the mixed lay and medical Committee for the prevention and relief of heart disease, which is endeavoring to arouse the public to an active campaign in America.

THE TREATMENT OF RHEUMATIC CONDITIONS. Wm. M. Crofton,¹ of Dublin, states his conclusion that rheumatism, rheumatoid arthritis, arthritis deformans, and gout differ, not as usually believed, in their

¹ Medical Press, January 24, 1917.

etiology, but only in the quality of the toxins or of the tissues, and in the quantity of urates in the circulation. In all of them there is a primary infection, usually in the upper alimentary or respiratory tract; and a secondary gastro-intestinal infection due to its pathogenic influence upon the coliform microbes of the intestine. This leads to a continuous absorption of toxins, which originates and maintains the peripheral lesions. In addition, the excess of protein usually ingested produces by reduction an excess of amino-acids, these, being deaminized, supply ammonia for the formation of urea and of an excess of acids (particularly sarcolactic acid) detrimental to healthy metabolism which needs an alkaline medium. Impairment of digestion and of assimilation completes the vicious circles thus set up (*a*) in the intestine, and (*b*) in the tissues. Such is the hypothesis upon which his prophylaxis and treatment are founded, both for the acute and the chronic affections. They consist in clearing up the sources of infection; and in raising the resistance to the secondary intestinal sepsis: namely by progressive inoculations of vaccines (1) from the original focus, (2) from the coliform bacilli, and (3) from any microbe (other than *B. coli* or streptococci) found in the urine. The correction of acidosis is essential; and he has found the control of reactions by iodine therapy most useful.

In rheumatic fever the causal organism obtainable from the primary lesion, the joints and the blood (and presumably the urine and feces), usually known as the *Diplococcus rheumaticus*, is in appearance and culture identical with the streptococcus commonly found in tonsils, adenoids, pyorrhea, etc. *Prevention* can be secured by a timely removal of the tonsils or adenoids and a course of vaccinations with doses ranging from $2\frac{1}{2}$, 5, $7\frac{1}{2}$, etc., up to 100 million. The prevailing *treatment* is inadequate: symptoms are relieved, but endocarditis is not prevented. Better results should be sought in a combination of immunotherapy with chemotherapy. An autogenous vaccination should be made (the dose being $2\frac{1}{2}$ up to 20 million and more if necessary) during the acute stage; or as soon as possible to prevent relapse. Medicinally, sodium citrate should be given freely till the urine is neutral. And, in addition, from his favorable experience of sodium di-iodosalicylate as a powerful intravital killer of streptococci, Crofton strongly recommends the trial of a daily intravenous injection of 2 to 5 c.c. of its 1 per cent. solution.

HOT SAND AS A SUBSTITUTE FOR LOCAL RADIANT HEAT, recently advocated by W. Gordon, of Exeter, is the subject of practical remarks by H. French in the *British Medical Journal*, March 3, 1917. Keep the fine silver sand in a large tin suitably near the kitchen fire or range, so that the hand dug into it can just bear the heat. Spread a mackintosh sheet over the bed or couch, where a hollow is provided by cushions for the sand. If the limb is tender, do not pile much sand over it. Keep in the heat by a second mackintosh. The curative effect is from the heat hyperemia. Possibly, too, the hot sand may become electrically charged. Massage, if indicated, is rendered much more effectual after a sand bath of twenty minutes or more. This may be repeated

once or twice in the day. The limb must be raised to remove the sand bodily in the lower mackintosh; this is replaced by the clean upper one, while the grains adhering to the damp skin are being washed off by the drip from a hot sponge.

ELECTRICITY MORE EFFICIENT IN CARDIAC AND VASCULAR DISEASE THAN ANY OTHER TREATMENT. H. Weber¹ makes that claim for the "Condensator current" which he has used with great benefit in the 19 cases he reports. He advocates it for all organic heart disease, except when badly decompensated; also in cardiac neuroses, when free from extreme nervous irritability; and in arteriosclerosis of all degrees, even when affecting the coronaries, provided the kidney is not contracted.

The functional heart tests upon which he relies are the following: An inability to hold the breath for thirteen to fifteen seconds during quiet breathing strongly suggests muscular inadequacy of the heart. Absence of the normal pulse slowing on recumbency argues some cardiac affection imperfectly compensated. Herz's self-inhibition is simple and delicate: the patient concentrates his attention upon the slow performance of an elbow flexion followed by an extension. With a sound heart the pulse is not affected; in myocardial disease, it is considerably retarded; and in cardiac neuropathies it is much accelerated. Weber controls his method by hemoglobin determinations, by urine examinations, and by measurements of the heart shadow. His "condensator current" is apparently a special adaptation of the galvanic current.

DIGITALIS TREATMENT AND ARRHYTHMIA. H. Boruttau and E. Stadelmann,² adopt the view that the drug works its retarding effect primarily by influencing the vagus, as compressing the vagus sometimes produces a transient slowing. We owe to electrocardiography a recognition of the frequent occurrence of an "unsuspected habitual minor arrhythmia," which is not forced upon our attention by a sufficiently striking irregularity of the intervals between pulse beats. Very small doses of digitalis, by rapidly regulating this larval form of arrhythmia perpetua, point to the best line of treatment for the latter: namely, a long-continued administration of very small doses; under electrocardiographic guidance which may suggest temporary interruptions; and under a suitable regulation of life and of diet. The digitalis should be supplemented, or alternated, with diuretics. That small-dose treatment is of special value in the borderline cases verging upon fibrillation, whenever the auricular beat assumes undue frequency.

AORTIC REGURGITATION AND DIGITALIS. The fact has to be borne in mind, in discussing this therapeutic question, that nature meets the circulatory difficulty by a universal arteriolar relaxation which distributes the increased ventricular systolic output and pressure over the entire capillary area. This becomes pulsatile and capacious: acting both as a systolic reservoir and as a buffer; and capillary hemorrhages do not occur. That safety mechanism works true for the protection not only of the periphery but also of the overburdened heart. A. D.

¹ Correspondenz-Blatt f. schw. A., January 20, 1917.

² Deut. med. Woch., January 4, 1917.

Bush's¹ elucidation of the clinical question deals mainly with the cardiac factor; and with the common objection that digitalis, by prolonging the diastole, permits an increased regurgitation affecting, in the first place, the coronary nutritive supply. His first answer is that a large part of this lengthened pause is occupied by delayed relaxation of the ventricles. Systole is more complete under the action of digitalis; and though diastole is also more complete, its relative time is actually briefer, owing to the less prompt relaxation from systole. In other words, diastole occupies a smaller percentage of the time involved in a cardiac cycle than before the administration of the drug. As a result, though there may be an actual slowing of the heart under digitalis (about 0.6 per cent., in his series of observations in the normal human being), there is probably little additional opportunity for regurgitation from the aorta because of this factor. A second advantage gained is the increased force given to the ventricular contraction. These two factors warrant the use of digitalis. Moreover increased nutrition is provided for the heart muscle itself and renders available greater potential energy for the systolic effort.

In mitral incompetence there is increasing interference with the venous circulation, pulmonic when the initial lesion is sinistral, and systemic if the right side is primarily involved; although ultimately in either lesion. Under digitalis the improvement is explainable as follows: Digitalis acts on the whole musculature of the heart, as is shown by the beneficial action of the drug in auricular fibrillation; therefore we may expect an augmented auricular contraction with a possible tendency toward delayed relaxation. Then, if we accept the tentative hypothesis that the wave of contraction affects the ventricle in the papillary muscles first, a better approximation of the leaflets of the mitral valve would ensue from digitalis stimulation, provided there is no actual stenosis. The peculiar arrangement of the deeper sinospiral fibers indicates that in the more vigorous contractions of the digitalis heart, the blood stream tends to be diverted more directly into the aortic antrum and away from the region of the mitral orifice, thereby lessening the tendency to mitral reflux.

STROPHANTHINE INTRAVENOUSLY ADMINISTERED has been recommended for some time past for acute cardiac failure. John² adds the following cogent reasons. The digitalis group of drugs are the most potent regulators for fibrillating auricles. Fibrillation most often attacks hearts previously tried by disease. Its onset is apt to be so sudden that oral medication may be too slow for efficiency. Moreover, some stomachs will not tolerate any member of the group, and a fatal vicious circle may be induced. Strophanthine injected into a vein in doses from $\frac{1}{500}$ to $\frac{1}{50}$ of a grain takes immediate action in slowing the heart and restoring the circulation, a truly life-saving remedy.

HEART MASSAGE BY ARGAUD'S METHOD. Leonard J. Kidd³ questions the value of the usual bimanual continuous ventricular massage,

¹ New York Medical Journal, December 16, 1916.

² Liverpool Med. Chir. Jour., 1916, No. 69.

³ British Medical Journal, April 14, 1917.

and urges a trial of the intermittent stimulation of the right auricle by light taps of the finger-tips, which was suggested by Argaud,¹ in 1913, from his observations on the exposed heart of a man, aged twenty years, shortly after decapitation. A spontaneous contraction occurred forty-five minutes after the event; and the heart ceased to be excitable at the eighty-third minute. Meanwhile contractions had been elicited by mechanical stimulation until the sixty-second minute, chiefly when applied to the right auricle. The heart was then opened; and electrical stimulations were applied inside its cavities. Those applied to the right ventricular, and to the left auricular and ventricular endocardium were ineffective; but contraction followed those of the right auricular endocardium. He found that the most excitable region of all corresponded with the tenia of His, the Keith-Flack node, and the valve of Thebesius, namely, the region of the heart which is richest in nerve ganglia. Argaud had often found such ganglia in the substance of the Thebesian valve of man and other mammals. This method does not appear to have been tried clinically. Kidd thinks it ought to be given a trial without further delay, as clearly the most promising; and also because of the surgeon's reluctance to open the abdomen for the purpose of the bimanual subdiaphragmatic ventricular massage. He suggests that the optimum interval between successive finger taps (which has not yet been determined) would probably be not less than ten nor more than thirty seconds.

THE HISTORY OF A SUCCESSFUL MASSAGE OF THE HEART IN ANESTHESIA IN A BOY is detailed by W. M. Mollison.² After throat swabbings, Sylvester, stimulants, and pituitary extract (0.5 c.c. *sub cutem*,) an incision was made (wounding the liver) and the right hand inserted between liver and diaphragm. At first respiration began and the pupil contracted, but the heart failed to respond. One c.c. of pituitrin was then injected into the heart and the massage renewed. After about twenty minutes the heart was beating strongly. It was almost certain that the time during which the heart stopped was between thirteen and twenty-four minutes, and probably about twenty minutes. The whole episode lasted about thirty-five minutes. In bed, saline infusion was administered. One hour later the boy developed choreiform movements, during which his intestines protruded through the abdominal wound, which had been hurriedly stitched up. These were put back later. For seven days he was more or less unconscious. During the second week there were periods of rigidity, tetany, and of screaming which was almost continuous for thirty-six hours. In spite of that severe cerebral irritation, he eventually made a perfect recovery. A study of his case and of the records of 13 other complete or partial successes seemed to indicate the heart massage should not be postponed too long; and ought always to be performed through an abdominal wound. In criticizing the paper, J. Blomfield deprecated any hasty routine resort to the procedure in cases where it might not be

¹ Comptes rendus de l'Ac. d. Sc., p. 1737.

² British Medical Journal, 1916, ii, 653.

essential. M. S. Pembry remarked that the fact that artificial respiration could be of no use in the absence of circulation was often overlooked. It had been shown that the human heart could be revived by perfusion, and made to start beating again some hours after death. The cerebral irritation certainly indicated that there had been cessation of the circulation for a considerable period. Children withstand a lack of oxygen better than adults.

THE CLINICAL USES OF PAPAVERINE. D. J. Macht¹ uses the sulphate or the hydrochloride, and reports encouraging results. Subcutaneous doses of 40 to 80 mg. are safe; 40 mg. of it produce almost as much general analgesia as 10 mg. of morphine; with much less narcotic effect, and with associated respiratory stimulation. It is a bronchodilator; and relaxes all smooth muscle tissue, including strips of intestine, uterus, bladder, or of the excised pyloric sphincter. Its direct action on the heart muscle or intrinsic ganglia is a marked increase in tonicity and output, and a slight slowing of rate. It is a powerful dilator of the coronary artery; and it lowers general blood-pressure, by directly dilating the bloodvessels, especially the splanchnic and peripheral vessels. In most instances of cardiac dyspnea, it proved efficient. A case of bronchial asthma was relieved immediately. Its combined effects on the circulation in promoting the coronary circulation and stimulating the heart while lowering the blood-pressure, suggests its use in angina pectoris, and in hypertension. Pal has used it to abort uremic crises. Its stimulating action upon the respiratory center suggests its use instead of morphine in special cases. Macht on three occasions has slowly injected 40 mg. of papaverine intravenously without any untoward symptoms, after dilution with 200 c.c. of saline solution.

¹ Archives of Internal Medicine, June, 1916.

DERMATOLOGY AND SYPHILIS.

BY WILLIAM S. GOTTHEIL, M.D.

DERMATOLOGY.

Autoserotherapy. This subject has been discussed at some length in last year's review, and that of the year before;¹ and various articles have appeared on the subject by myself and others. Nevertheless, I am constantly in receipt of inquiries as to the uses and limitations of the method, the technic to be employed, etc. It is not possible, of course, to go over the ground again, and the reader is referred to the previous reviews for information.

It may be useful to epitomize the conclusions that I have recorded in my² last paper on the subject:

1. In psoriasis, the autoserum treatment, while not in itself curative of the disease, is an important factor in the treatment. It cuts down the time required for the troublesome local treatment from weeks to days, and enables us to promise to clear the skin in from three to ten days, in even the worst and most obstinate cases. It often postpones relapses for a long time, possibly indefinitely. In most cases it influences the type of the disease, so that the relapsing lesions are few and insignificant, and are readily amenable to mild local treatment.

To this conclusion I must add, as the result of some eight months further experience with the remedy, that I have had several cases recently in which the results were not so satisfactory. It is true these cases were instances of the most obstinate, extensive, and chronic types of the disease, indurated gyrate and seborrheal psoriasis covering the entire body, which had been present for many years, and which had been treated in many ways by various men without any effect at all; and it is also true that conditions were unfavorable in all of them, either on account of excessive sensitiveness of the skin, business engagements, or other extraneous circumstances. I succeeded in removing say nine-tenths of the eruption; but, in each one, reddened papules remained at the margins or even in the centers of the lesions when the treatment was concluded; and in 1 case new lesions began to appear immediately afterward. Of course, in these cases, the only thing to advise was an immediate second course of treatment, to which, as it chanced, not one of the 3 cases agreed. It is only fair to state, also, that all these cases had been subjected to x-ray treatment in the past in unknown doses and extent; and I have learned by experience to be cautious in the severity of the local treatment I employ under these circumstances.

¹ PROGRESSIVE MEDICINE, September, 1915, p. 97; September, 1916, p. 107.

² New York Medical Journal, June 24, 1916.

2. In chronic urticaria, neurodermatitis, pruritus senilis, and other itchy dermatoses, it is worthy of trial. In some cases its action is effective and brilliant.

3. It is of some value in bad pustular acne; but in furunculosis, folliculitis, and other pus infections, I have not found it useful.

4. In chronic eczema, the same may be said as in acne; the injections are sometimes apparently effective, and at others fail entirely.

5. In pemphigus, lepra, and obstinate lichen planus, it is ineffective.

6. In syphilis, it is useless.

It may not be out of place to mention here that autoserum medication has lately been found efficacious in fields other than that of dermatology. Holm¹ has used it with benefit in hemorrhage of the newborn, hemorrhage from gastric ulcer, splenomyeloid leukemia, and pernicious anemia; Spiethoff² praises it in the inflammatory complications of gonorrhea, epididymitis and prostatitis; Kahn and Emsheimer³ found definite improvement from its use in bronchial asthma; and Goodman⁴ has recorded marked improvement and even cure from it in the same affection.

Family Albinism. Albino was the term employed by the Portuguese to designate a white Moor; but the condition was well known long before the time of the Portuguese conquests in Africa, and is mentioned in Pliny and Herodotus. The general condition is known as albinism or albinismus. When it is complete, the skin of the entire body is milky white, usually with a pinkish tinge due to the integumentary blood supply. The hair is very fine, soft, and whitish or whitish-yellow in color; but in exceptional instances, as recorded by Folker, it is bright red (this is especially apt to be the case in albino negroes, a whole family of whom, all with red hair, was under my observation some years ago). The irides are colorless, or pinkish from the blood supply, or light blue; and the pupils, owing to the absence of color in the choroid, are reddish or pinkish for the same reason. The eyes show extreme sensitiveness to light, owing to the absence of pigment; hence photophobia and nystagmus are usually present. The skin is normal in structure and function, save for the complete absence of pigment. The condition is a permanent one, though Ascherson, Phoebus, and Mayer have recorded exceptional instances in which the pigment partially returned. The abnormality is more frequent in dark than in light-skinned individuals, and is especially prevalent in the tropics. Negroes are apparently more subject to it than whites.

The abnormality is a familial one, several children at least in a family being usually affected. Saint-Hilaire states that it is commoner in females than in males. In the cases reported by Marcy, the father and the mother were full-blooded negroes; the 2 first children, males, were black, then came 2 females, both albinos, then another black female child, and lastly a sixth male albino. Folker's cases were whites; in

¹ Journal-Lancet, Minneapolis, December 15, 1916.

² Medizinische Klinik, Berlin, November 26, 1916; November 19, 1896.

³ Archives of Internal Medicine, Chicago, October, 1916.

⁴ California State Journal of Medicine, San Francisco, January, 1917.

addition to an albino girl with red hair, there were 2 other children of the pure albino type; the other offspring, 5 in number, were normal, as were both the father and the mother. Syms' cases occurred in a family in which 4 of the 7 children, the first, third, fifth, and seventh, were albinos; the parents and other relatives were normal. The irides in 3 of the 4 affected children were blue. Lesser mentions a family of 7 children of which 6 were without pigment; Pickel records a family of 13 children, with 7 albinos. Mayer observed that the second and fourth children in a family of 4 were pigmentless. Magnus has tabulated a series of 10 albino pedigrees; 1 of these was a family of 8, in which 7 were albinos.

The cases of so-called incomplete albinismus reported by Boyle among the blacks of Borneo were, so far as the skin manifestations were concerned, rather instances of vitiligo rather than true albinismus; the skin was of a dirty white color, interspersed with large freckle-like spots; the color of the hair "could hardly be described," the eyes were pale blue. The parents of one of Boyle's cases were normal, but his brothers and sisters were albinos, and many of his ancestors were said to have had the same abnormality. Burton states that in West Africa there is occasionally observed a condition which may be termed semi-albinism, in which the skin varies in color between the natural hue of the blacks and whites.

Crocker says that in some tropical countries, as in Loango in Lower Guinea, albinism is very frequent. Boon prints a statement made to him by an albino in the Leeward Islands, to the effect that the wife of the patient's uncle always bore twins, 1 of which was white and the other black. Kneeland mentions 2 albino children in the same family, with a black child born between them. An example of the tendency to reversion that is seen in many of these cases is mentioned by Stedman, to the effect that an albino negress married to a European had children that were mulattoes.

The old idea that the albinos once constituted a separate race, and that the appearance of the abnormality is an atavistic phenomenon, has been abandoned; as also have been the idea of Blumenbach, Winterbottom, Sprengel, and Otto, that it is a disease or the result of a disease. Of course, maternal impressions, so-called, has been blamed for it; this opinion being especially prevalent in the Philippines. To ascribe it to some fault of development of the pigment-producing apparatus is no explanation. I would suggest that one or more of the endocrinous glands, and more especially the suprarenal body, as the quarter where an explanation of the condition is to be sought.

The prevalence of albinism in the Philippines is of especial interest to us; Heiser and Villafranca have recently published an interesting monograph on the subject.¹ The Director of Health of the Islands reports 45 cases of albinism in the year 1910; the authors found 198 cases. Feeble mentality and impaired physique, which is commonly held to accompany albinism, was present only to the extent of 7 of the

¹ Philippine Journal of Science, 1913, p. 493.

first and 2 of the second class of defects in their cases. About half the cases gave a history of albinism in their immediate family or in close relatives; which is decidedly at variance with the results of investigation in other series of cases.

The facts above given are taken from the recent monograph by Knowles,¹ being recorded in connection with 2 sets of cases of his own occurring here. The first family consisted of 7 boys, 4 of them normal, and 3 of them of the typical complete albino type. The youngest, third, fifth, and seventh boys were intelligent and had the usual pigment development. The second, fourth and sixth sons had pink eyes and all the associated symptoms of albinism. The parents were Italian, with blue eyes and pink cheeks, and were pictures of good health. There was no family history of albinism. Two of the albinos were normal intellectually; the third, however, was somewhat of the cretin type. Photophobia and nystagmus were marked in all 3 affected boys.

The second family were Russian Jews, first cousins, coming from a family of about five hundred persons living in a small town in Russia, and always intermarrying. The great grandmother was the only known ancestor with the affection. The mother had had ten pregnancies and two miscarriages; 3 of the 8 children were albinos. The first 4 children were normal, the fifth was an albino, the sixth was normal, and the last 2 were without pigment. The normal children were all well and strong; those without pigment were always weak and sick, and suffered from photophobia and nystagmus.

Cicatrix Epithelioma. That scar tissue occasionally forms the starting-point of a carcinomatous degeneration of the skin is well known; in fact, under the formidable title of "*carcinoma épithéliale cicatrisans*," French dermatologists have set up a distinct clinical variety of cancer of the skin. Heidingsfeld² has recently published an article embodying the results of his extensive experience with this class of cases; and he suggests the title that I employ at the head of this article instead of the foreign designation.

Heidingsfeld's discussion is largely devoted to pathological and etiological considerations, and hence does not dwell on the practical side of the matter which more deeply interests the readers of this review. His conclusions may be summarized as follows:

1. Cicatrix epithelioma is a well-defined form of skin cancer.
2. Scar tissue, being below par in general resistance, is predisposed to degenerative changes.
3. All dermatoses and dermal injuries occasioning scar formation are therefore predisposing factors to cancer.

I append three of Heidingsfeld's illustrations showing the development of cancer of the skin from a smallpox scar, from the scar following an ulcerative syphilitic glossitis, and from that resulting from a burn (Figs. 11, 12 and 13).

¹ Interstate Medical Journal, 1916, xxiii, No. 7.

² Journal of the American Medical Association, November 18, 1916.



FIG. 11.—Heidingsfeld's case: Epithelioma developing in a variola cicatrix.

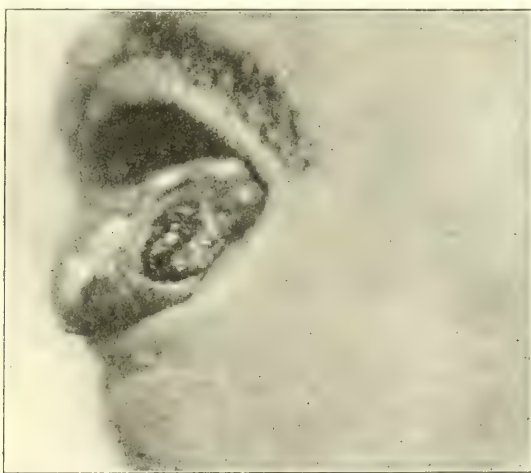


FIG. 12.—Heidingsfeld's case: Epithelioma following ulcerative syphilitic glossitis.

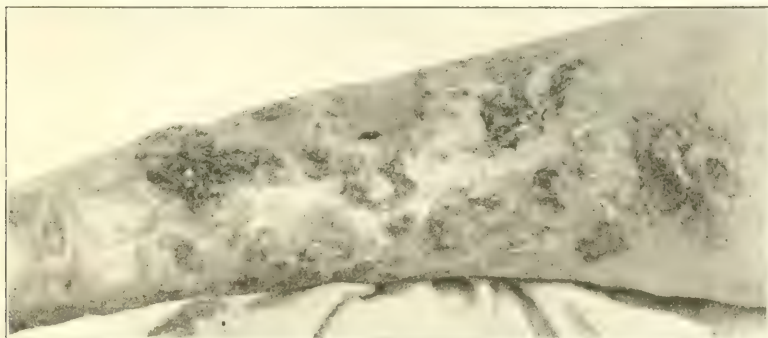


FIG. 13.—Heidingsfeld's case: Epithelioma following a burn.

Dyschromia and Staining of the Skin. But little attention has been paid to alterations in color of the skin alone; yet we have several clinically distinct affections, from chloasma, argyria and nevus pigmentosus on the one hand, to vitiligo or leukoderma on the other, in which changes in the pigment is the only apparent lesion; not to mention affections like lepra, in which achromia or dischromia is an important symptom of the affection.

Some years ago I noted and pictured in this review¹ a case of localized blue pigmentation of the skin due to cocain injections; and similar pigmentations have been seen after morphine and mercurial injections. Pusey² has recently recorded a case in which wet dressings with a solution of copperas occasioned the appearance of permanent small brown stains on the treated skin. The patient had apparently had an attack of dermatitis venenata, which had been treated, among other things, with a solution of ferrous sulphate, 1 ounce to 1 gallon of vinegar. At the time of this application there was a violent dermatitis, with a good deal of suppuration present. The dermatitis finally healed under salves of unknown composition; but the brown spots had appeared after the copperas application, and were present undiminished in intensity of coloration when Pusey first saw the case four or five months later. There were punctate stains of the skin over the entire area to which the lotion had been applied, yellow to dark brown in color; save in that they were not bluish black, they looked exactly like gun-powder stains. Pusey states that, according to a report made two years later, the stains were still present, but were slightly fainter in color. Microscopic and chemical examination showed conclusively that the pigment deposit was iron. Such insoluble materials are usually deposited in the epithelium, and disappear as this is gradually exfoliated. In this case, however, the ferrous sulphate in the vinegar solution came in contact with points where the skin was destroyed down to the corium. The alkaline lymph of these ulcerated points caused a precipitate of organic iron compounds, which were ultimately oxidized into ferric hydroxide; and this insoluble substance remained as a permanent stain.

Sutton³ has made an elaborate study of the dyschromias of syphilis; and I reproduce here two illustrations, one (Fig. 14) showing the ordinary, and one (Fig. 15) an unusual type of the appearance. He accepts Taylor's classification of the syphilitic dyschromias into two groups; a primary group composed chiefly of the retiform pigmentary syphiloderm, of which I show a picture of a case of my own (Fig. 16); and a secondary group, in which the hyperpigmentation or depigmentation is directly traceable to the presence in the past of syphilitic lesions of other types, and which Sutton's 2 cases illustrate.

In my own case the patient was a young woman in the early stages of secondary syphilis; she had had a general macular exanthem, which had disappeared as usual after a time; and she had then developed the retiform discoloration with depigmentation of the central areas which

¹ PROGRESSIVE MEDICINE, September, 1912, p. 105.

² Journal of the American Medical Association, February 24, 1917.

³ Ibid., December 21, 1916.

is commonly known under the name of leukoderma syphilitica. A close examination showed, however, that this latter term was a misnomer; the skin in the circular central areas was little, if at all, different in color

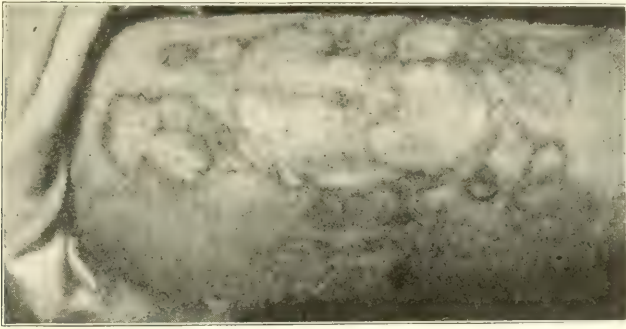


FIG. 14.—Sutton's case: Pigmentation following syphilitic eruption.

from the rest of the integument, while the retiform margins were distinctly hyperpigmented. In Sutton's first case (Fig. 14), the pigmentations had followed a tubercular syphiloderm of the leg, which had

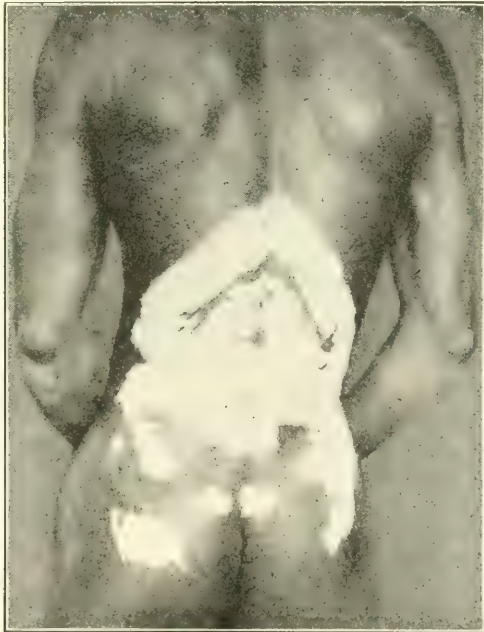


FIG. 15.—Sutton's case: Depigmentation following syphilitic eruption.

yielded promptly to arsenic and mercury. There was left, however, thin, smooth, flexible scars, with a considerable amount of brown pigmentation; and this pigmentation had gradually increased during

the succeeding twelve months. In Sutton's second case (Fig. 15), the patient was a full-blooded negro and the pigment changes, as is usual in such individuals, were very marked. The leukodermatous areas were very large and very white; and there was considerable pigment accumulation at the margins of the patches and in the small dark islands inside them. The history, as is also usual in these cases, was very defective; the patient had had some "lumps" at some previous time at the place; but he had a 4-plus Wassermann, and there could be no doubt of the diagnosis.

Regarding the treatment of these dyschromias, there is, unfortunately, but little to be said. Sutton recommends frequent applications of a 1 per cent. solution of mercuric chloride in equal parts of alcohol and water, this, he says, will usually give rise to sufficient desquamation



FIG. 16.—Gottheil's case: Leukoderma syphilitica.

to eliminate the excessive coloring matter; but recurrences are common. Constitutional treatment has, of course, no effect on these lesions, which are usually merely the remains of past processes, and therefore permanent. My own experience is that no treatment will improve their appearance to any great degree.

Foreign Protein Injections. Engman and McGarry¹, in recounting their experiences with the intravenous injection of a foreign protein in the treatment of certain diseases of the skin, say distinctly that the method is not recommended as a form of treatment for any special disease or diseases. Basing their efforts on the well-known facts that various chronic dermatoses show great improvement when intercurrent infections associated with high temperatures occur, as with psoriasis efflorescences

¹ Journal of the American Medical Association, December 9, 1916.

when a pneumonia or typhoid intervenes and with lepra nodules after some other infection or a toxin injection, the authors believe that the hyperpyrexia is probably the cause of the local improvement. Jobling and Petersen,¹ Miller and Lusk,² Smith,³ and others, report good therapeutic results from the introduction of a foreign protein into the body in various affections.

Engman and McGarry selected a typhoid vaccine prepared by a reliable manufacturer as the remedy to be employed, using it in a number of cases taken at random as they entered the hospital, but selecting rather those whose cause was either unknown or was a recognized micro-organism. All of them were kept in the hospital under close observation during the treatment. All the injections, except with 1 patient, were intravenous, varying from 75,000,000 to 500,000,000 of the so-called "prophylactic" suspension of the typhoid bacillus. In none of the cases was there any lasting inconvenience noted. All the patients had chills accompanied by a sharp rise of temperature from 100° to 105° F. All showed a slight, but not marked, rise in the number of leukocytes. In 1 case, after the second injection, a marked nephritis, with some microscopic blood in the urine, developed; but the patient quickly recovered under rest and a selected diet. In all, the local lesion, and especially in lupus erythematosus, became much redder and sometimes itched and burned for from an hour to three hours after the injection. Herpes labialis was a common occurrence after the chills and fever.

Five psoriasis cases were treated with the following general results: In 3 cases the lesions apparently retrogressed markedly, but resumed their usual appearance in a week or ten days, while 2 were slightly, if at all, benefited. There were 6 cases of lupus erythematosus of varying type and degree. There was very marked improvement in all of these; but the authors are careful not to claim that they were cured. A case of parapsoriasis was greatly improved. A dermatitis herpetiformis showed slight improvement after a very few injections. In a case of Darier's disease the injection seemed to stimulate the formation of lesions. Three cases of syphilodermata improved slightly. A case of acute exfoliative dermatitis showed marked improvement.

The authors do not attempt to decide whether the hyperpyrexia, the mobilization of ferments, colloidal dispersion, specific action on the skin capillaries, or the setting in operation of immunizing forces, are the factors to be credited for the changes in the lesions. But they are sure that the process awakened by the injection of this protein has to do with some fundamental principle which should be elucidated, and that it will open the way to a more exact therapy in many diseases. When they observed from day to day the remarkable effects produced in some of the cases, the method seems to hold much promise. To see a chronic patch of lupus erythematosus, which has existed for years, clear up or partially disappear after one or two injections of the foreign protein is itself startling. The fact that the patients showed relapses does not alter the importance of the possibilities. Engman and McGarry now

¹ Journal of the American Medical Association, June 3, 1916.

² Ibidem.

³ Ibidem.

propose to carry on similar investigations with non-specific and non-bacterial proteases.



FIG. 17.—Engman and McGarry's case: Lupus erythematosus before treatment.

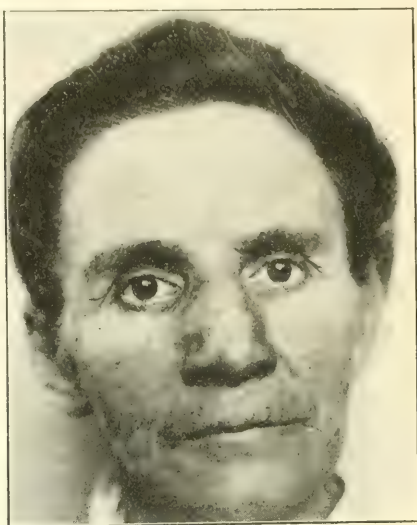


FIG. 18.—Engman and McGarry's case: Lupus erythematosus after treatment.



FIG. 19.—Engman and McGarry's case: Lupus erythematosus before treatment.



FIG. 20.—Engman and McGarry's case: Lupus erythematosus after treatment.

I append pictures of 2 of the cases of lupus erythematosus before and after the injections. (Figs. 17, 18, 19 and 20.)

Heliotherapy. This subject was considered at some length in last year's review;¹ but the title was employed to cover all forms of ray treatment, including the x -rays. It now seems desirable to limit its significance to the various methods of using light rays, including the ultraviolet ones, for therapeutic purposes; and deserving the terms radiotherapy for x -ray treatment with all its modifications, and radium treatment for the specific use of that material.

As Jordan remarks,² heliotherapy is not new; it has been used abroad for at least ten years, and its literature is already very extensive. Nevertheless, it has received but little attention here; the reasons for this being quite evident. The use of the sun's rays themselves, which was the first form in which the treatment was employed, may be practical in a sanitarium, where the time and attendance required can be gotten, and in a district where sunlight is plentiful and easily applicable; it is not a practical method for the physician, and in our average climate. The first artificial method of employing violet and ultraviolet light for therapeutic purposes was by means of the well-known Finsen apparatus. This machine, however, was extremely costly and cumbersome; and it has finally been practically discarded except in a few special institutions which could provide facilities for its use. To this there succeeded a number of smaller forms of so-called heliotherapeutic apparatus, about which the less said the better. I still see in physicians' offices various filament bulbs of 100, 250, or 500 candle power, in plain or blue glass containers, and with reflectors of large size, for the "blue light" treatment, as it was called, was widely exploited commercially. From the heliotherapeutic point of view, they are entirely useless; their only effect, if they have any, being due to the heat that is generated by them. Ultraviolet rays are small in amount or entirely wanting in apparatus of this kind. We now have, however, as explained in last year's review, two forms of lamp constructed on correct principles, and small and handy enough to be used in the office; I refer to the Kromayer lamp for circumscribed lesions, and the unfortunately named Alpine sun lamp for treating larger areas of the body. All that I shall have to say of heliotherapy is based on the employment of effective forms of apparatus such as these.

Jordan³ calls attention to the fact that the rays that we want to employ, the violet and ultraviolet, do not, under ordinary circumstances, penetrate more than $\frac{1}{50}$ of an inch into the skin; to get a deeper effect, we must employ pressure and the blue-ray filter in addition; and that hence, provided ordinary precautions as to dosage are employed, there is no likelihood of untoward effects appearing. He lays down the following general considerations of conditions affecting the dosage used:

1. Dark-complexioned skins that are well pigmented, and that tan rather than blister on exposure to light, stand larger dosage than others.
2. Thin skins, with little fat, and skins that are very sensitive to irritation, as shown by a wheal reaction on slight scratching, should have small initial doses.

¹ PROGRESSIVE MEDICINE, September, 1916, p. 116.

² Northwest Medicine, January, 1917.

³ Loc. cit.

3. The hands, palms and backs, the soles, the head and other parts covered with hair, require larger doses of the light; the mucosæ stand medium amounts; but the genitalia, flexor surfaces of the limbs, etc., should have very moderate doses.

4. Treatment should be given every other or every third day within a week, so as not to lose the cumulative effect of the rays.

Considerable personal experience with these two forms of apparatus on my part enables me to formulate certain rules for their employment, as well as some necessary warnings. Light employed in this manner is a physical agent of great power, and may be unexpected damage if used inconsiderately. The Alpine sun lamp is used for large surfaces of the body placed from one to two feet away; the exact area treated being limited by the shields and fenestra attached to the instrument. The time of exposure varies with the sensitiveness of the individual skin and of the part of the integument treated; in general, it is from ten minutes to half an hour. Exposures should be made every other or every third day. An excessive reaction is shown by rather intense inflammation and blistering, exactly as is the case on exposure to the sun's rays. The action of the rays, however, when administered in this way, is quite superficial; and there is no ill effect, save the temporary one of the inflammatory reaction. A thorough tanning of the skin, similar to that gotten from prolonged exposure to the sun's rays is the result aimed at. The action of the Kromayer lamp is much more vigorous, and care must be taken lest it is too intense. As a general rule the blue filters should be employed and only when marked and deep effect is intended should the rock crystal condensers be applied directly to the skin. The times of exposure, also, should be very short, from ten to sixty seconds only.

Special care must be taken to protect the eyes of the operators and the patient. The goggles supplied with the apparatus are not sufficient; I use deep tinted blue or smoked glasses. Neglect of these precautions has occasionally caused both the nurses and myself some trouble; conjunctivitis, persistent headache, and temporary hemianopsia, and other symptoms similar to those of "snow-blindness" have occurred.

The indications for the employment of heliotherapy have been very extended and indefinite, as is usual with remedial agents of this nature. Thus, Jordan¹ records the following as the affections in which he advises its employment: Acne vulgaris, acne rosacea, furuncles, pruritus, eczema, psoriasis, alopecia areata, ulcerative stomatitis, ulcers of non-specific origin, erysipelas, keloids of moderate extent, coccogenic sycosis, alopecia prematura, nevus pigmentosus, nevus vascularis, pigmented stains following old acne lesions, scars of moderate degree, seborrhea, seborrheic dermatitis; a truly variegated list. I cannot make any such claims. I have found the two forms of apparatus for applying light as a therapeutic agent useful in the following cases:

The irradiation of larger areas by means of the Alpine sun lamp is useful in all forms of alopecia, the premature, that occurring after general infections and febrile disease, and in alopecia areata; also in

¹ Loc. cit.

follicular coccigenic infections and folliculitides, and in sebaceous gland infections, as acne, etc. The more localized and intenser action of the Kromayer lamp is very useful in localized infections of definite nature, such as furunculosis and chancroidal ulcerations; in the treatment of localized nodules of lupus vulgaris, in small keloidal tumors, and possibly for small angiomas or nevi. I have not found either form of apparatus of much benefit in the more generalized dermatoses, erysipelas, rosacea, seborrhea, eczema, or psoriasis. Here, as elsewhere, excessive claims may interfere with the use of any means of treatment that has a certain definite field, and may lead to its general rejection. And I would hazard a guess that the beneficial effect of heliotherapy in general is perhaps due only to the reactive inflammation that the light rays occasion, together with the added resistance to external and internal noxae furnished by the tanning of the superficial epidermis that it occasions.



FIG. 21.—*Lepra mutilans*: Rosenthal's case.

Lepra Mutilans. This case, reported by Rosenthal,¹ is of interest as being a well-marked example of the disease at least ten years old, and having been treated both as an ambulatory and a bed case in several hospitals in a large city without the disease having been recognized. It was first reported to the health department in a large city as a case

¹ Journal of the American Medical Association, October 28, 1916.

of leprosy last year; but the department treated him simply as a pauper, and referred him to the supervisor of city charities for admission to the almshouse. This department in turn, claiming leprosy to be a menace, refused him admission, and transferred the case to the City Charity Organization Society for financial assistance. He was a bootblack by occupation, using brushes with leather bands to enable him to work; and the mere chance that his stand was in the neighborhood of a large hospital, and that his patients were largely medical students, led to the diagnosis and reporting of the case. I append an illustration of the case (Fig. 21), and also one of a radiograph of his mutilated hands (Fig. 22).

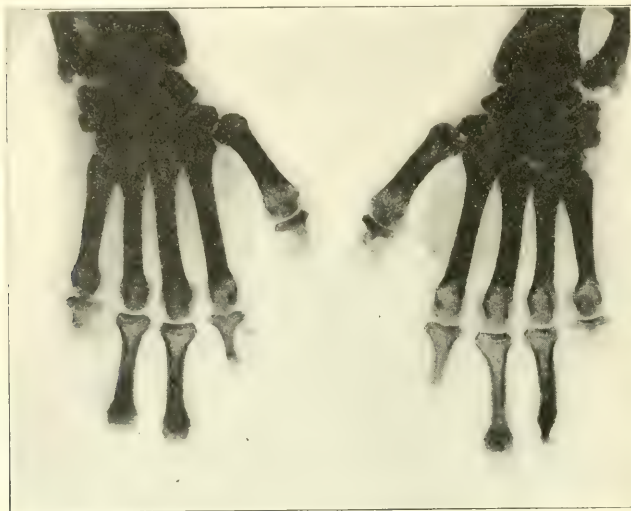


FIG. 22.—*Lepra mutilans*: Rosenthal's case.

The National Leprosarium. The establishment of a National Hospital for the care of lepers has long been advocated by the American Dermatological Association, the Section on Dermatology of the American Medical Association, and many other medical bodies, as well as by the United States Public Health Service, etc. With the exception of three States which maintain permanent leprosariums, the number of leprosy patients in any one State is too small to justify the maintenance of a separate hospital for their case; the entire number in the United States being estimated at about 1000. Besides this, most of the trouble in taking care of these sufferers has been due to disputes as to jurisdiction or responsibility of different States in the matter, or questions arising out to the interstate transportation of lepers.¹ While dermatologists are agreed that the contagion of lepra is, in this climate, a very mild one, and that there is little or no danger of transmission of the disease under the conditions of ordinary social life, there does seem to be a slight increase in the number of cases detected. Some provision ought to be

¹ Journal of the American Medical Association, December 16, 1916.

made for them; if only to avoid the very undesirable conflicts of authority and responsibility between various State and municipal authorities, and the hysterical exhibitions of fear and disgust when a case is found.

Engmann¹ informs us that the bill, though introduced long ago, is still on the Senate calendar; though the Senate Committee on Public Health and National Quarantine held elaborate hearings in March of last year, and reported on it favorably. Senate Bill 4086, providing for a National Leprosarium, should have the united support of the medical profession, and an effort should be made to advance its consideration and secure its passage as soon as possible.

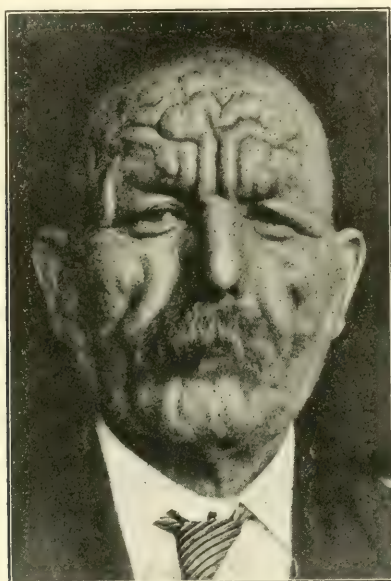


FIG. 23.—Leukemia cutis: Sweitzer's case.

Leukemia of the Skin. The case reported by Sweitzer² is of interest not only on account of the rarity of the affection, but also because of the superficial resemblance of the lesions on the face to leprosy. The skin of the face was most markedly affected (Fig. 23) but the lichenoid thickening of the skin was present over most of the body. The trouble had first been noticed two years before and was getting worse. Numerous blood counts showed neither an actual, nor a relative, increase in the lymphocytes. Biopsies showed the alteration in the integument to be a pure lymphocytic infiltration of the skin, in spite of the negative blood results. A systematic radiotherapeutic course of treatment was instituted, with the result of a very marked improvement in the skin condition.

¹ Journal of the American Medical Association, December 16, 1916.

² Ibidem, November 15, 1916.

The Paraffin Treatment of Burns. Under the names of "ambrine," "hyperthermine," "thermozine," etc., a number of secret preparations have been advocated for the treatment of this common injury of the skin which seem to possess merit. Hull¹ has investigated the method, and reports that slight burns heal with singular rapidity, and that persons severely burned recover who would not have recovered so completely under the ordinary methods of treatment. This depends, in his opinion, entirely on the mechanical factors that the dressing brings into play; protection from the air, shielding of the new-formed granulations from damage, the immobilization of the damaged tissues, and the heat of the application, which encourages lymph flow and blood supply to the new capillaries. The essential element in the various preparations is a paraffin of a suitable melting-point; and Hull found that a paraffin heated to 130° C. by superheated steam became soft and workable, was lowered two degrees in its melting-point, and was eminently suitable for the dressing. After considerable experimentation, he found that the addition of certain antiseptics to the paraffin was advisable; and since resorcin, the agent first used for that purpose, is now hard to obtain, the following formula was finally evolved:

Beta-naphthol	0.25 per cent.
Eucalyptus oil	2.0 "
Olive oil	5.0 "
Paraffin molle (soft)	25.0 "
Paraffin durum (hard)	67.75 "

Melt the hard paraffin, and add the soft paraffin and the olive oil. Dissolve the beta-naphthol in absolute alcohol, and add it to the mixture. Add the eucalyptus oil when the wax has cooled to about 55° C.

The paraffin is applied at the first dressing, save exceptionally, in very septic burns, hot boric acid fomentations are used for two days first. Wash the burn with sterile water, and dry by placing pieces of dry gauze over it. Cover the burn with a layer of paraffin at 50° C.; the above preparation has a melting-point of about 48° C. The temperature may be estimated by waiting until the wax shows a solidifying film upon the surface. A broad camel-hair brush, sterilized in wax, will be found to be a rapid and painless method of applying the paraffin, sprays are troublesome. A thin layer of absorbent cotton of the same size as the burn is placed over the first layer of paraffin, and then more paraffin is applied. Over this is placed more layers of cotton and then the wound is bandaged. Dressings are changed daily, save in the later stages, when the burn is clean and only a small amount of pus is formed, when it can be left *in situ* for forty-eight hours. Blisters are not interfered with in any way at the first dressing; the paraffin is applied after washing the burn. At the second dressing, the dead layers of skin are cut away. Sloughs usually separate after a few dressings.

Haworth's formula² is very similar to the above; he uses resorcin

¹ British Medical Journal, January 13, 1917.

² Journal of the American Medical Association, May 12, 1917.

and a little Sudan III or scarlet red in the mixture. Burns, acid corrosions, frost-bites, or any dermal ulceration that fails to epidermidize properly may be treated in this way. It is worth trying in the ulcerations of chronic dermatitis (leg ulcers).

Radium in Dermatology. Mention was made of this subject in the review of two years ago;¹ since which time a number of articles have appeared dealing with it, without, however, invalidating the conclusions then arrived at. It seems to be of use in some affections of the skin; but its employment is a necessity in very exceptional cases only. Its cost prevents its general use by the practitioner, and it is essentially a dermatotherapeutic luxury which even few dermatologists employ. Nevertheless, it seems necessary at this stage of the development of its use to know something about it. The chief facts are the following which I take from the article by Cole.²

Radium itself is a dark gray substance with an atomic weight of 225.9, and an average life of 2440 years. It continuously projects particles into space, so that it is estimated that it loses half its strength in 1800 years. The loss depends on the giving off of three kinds of rays, known as alpha, beta, and gamma rays; and the end-result is a substance which it is impossible to differentiate from lead.

The alpha rays are real atoms charged with electricity, and are now known to be the element recognized as helium; they are of short wave length and irregular in action. As they cannot penetrate rubber or paper they are readily screened off when required. They are very numerous, much more so than the beta or gamma rays. They are to be used when a superficial irritant action is required; short exposures of the unscreened radium is the method of getting their effect.

The beta rays are electrons, and of greater wave length. They penetrate much more deeply than do the alpha rays, and to screen them off a thin layer of metal, aluminum, brass, or lead, is required. Longer exposures than with the alpha rays are allowable.

The gamma rays are of great length, though comparatively few in number. Their penetrative power is very great; they will go through even twelve inches of steel. When we want to obtain their deep action the alpha and beta rays are to be cut out with a thick piece of brass or lead, and exposures of three or four hours, or longer, are permissible.

The "dosage" of a radium treatment is best expressed by the number of hours of treatment multiplied by the weight in milligrams of radium used. Thus 10 mg. used for one hour is spoken of as a 10 mg. hour dose, and 50 mg. employed for three hours is a 150 mg. hour dose.

Cole, himself, prefers the use of the radium in varnishes; most authorities employ the agent in small glass capsules. His best results were attained in *nevi*, especially those of the deep-seated, cavernous variety. He uses a thick, metallic screening so as to utilize the gamma rays; and he recommends the "cross fire" method to ensure quicker and more lasting results. He has treated 5 cases, with resultant cure in all of them. He also recommends the remedy in *keloid* and in *lupus erythe-*

¹ PROGRESSIVE MEDICINE, September, 1915, p. 123.

² Cleveland Medical Journal, October, 1916.

matosus. It is in the *basal-cell epithelioma*, so common on the face, that Cole has gotten his best results. He believes it to be the remedy *par excellence* in this condition; it is painless, easily applied, readily controlled, and leaves by little scarring. Recurrence was seen in but 1 case. Concluding, Cole considers radium, when properly applied and conservatively used, a very useful remedy in dermatology; but he deprecates its exploitation as a cure-all, and condemns the practitioner who treats all manner of skin conditions with a small amount of radium, feeling that he is doing harm not only to the patient, but to the profession and to radium itself.

Aikins¹ has used radium more especially in the treatment of *rodent ulcer*, in which condition he considers it a specific. Most of his patients have responded readily to the treatment, and have remained cured over a period of years. This is a rather strange statement to make in a paper read in May, 1915, when the dermatotherapeutic use of this substance was still uncommon. He mentions a circumstance to which I have repeatedly called attention, namely, that cases that have had much previous treatment, such as *x*-rays, ionization, or solid carbon dioxide, do not respond to radium as well as others do. This is especially and, in my opinion, really only true of the *x*-rays; I am always particularly cautious in my therapeutic measures and in my prognosis in such cases. The vitality of the tissue cells seems to be so affected that excessive action from mild treatment not infrequently occurs; granulation tissue formation is imperfect, and complete healing is delayed or may not occur. In addition to cancerous skin lesions, Aikins lauds radium in *lupus erythematosus*, *lupus vulgaris*, *pruritus*, *chronic eczema*, *acne rosacea*, and *rhinophyma*; a sufficiently long and varied list of affections. But he admits in conclusion that it is an accessory though necessary physical agent.

Simpson² holds that the *x*-rays are similar, but by no means identical, with the gamma rays of radium. The latter, he claims, is much safer to use, since the *x*-rays have well-known dangers, and there is always uncertainty as to the repair of tissue. Nevertheless, he considers that long experience is required to avoid the production of telangiectasia, atrophy, etc.; the very things that constitute our main objection to radiotherapy of the older form. Simpson also states that he often uses 150 mg. or more of radium in half a dozen or more tubes for a single treatment. This means an extremely expensive outfit; and the author himself admits that it is very important not to produce severe reactions or burns, as these are very liable to be very painful and heal very slowly. He has treated with radium a considerable number of cases of *cancer of the skin*, and states rather conservatively that he considers it on the whole one of our most satisfactory agents in these cases. In *cancer of the mucosa*, the results were, at times, brilliant, and, at other times, disappointing. The treatment of *vascular nevi*, the author admits, is an art in itself. In certain types of very extensive nevi the results from radium treatment are far in advance of those obtained by other methods. Radium has

¹ Canadian Practitioner and Review, October, 1915.

² Journal of the American Medical Association, November 18, 1916.

the advantage of being painless, while the cosmetic appearance is often excellent. There is place, however, he admits, for other well-known methods, electrolysis, solid carbon dioxide, the Kromayer lamp, etc., all of which give splendid results in selected cases. In *keloid*, Simpson claims to get excellent results from radium; pain is usually relieved, and the cosmetic results are good. In certain cases of *lupus vulgaris* the radium results are excellent; but, on the whole, they are probably inferior to those gotten from the Finsen lamp. The radium has no selective action on the diseased tissue, and its caustic effect must be employed; and the same must be done with tuberculosis verrucosa cutis.

In *lupus erythematosus*, which Simpson especially calls intractable, he has found radium to be of the greatest value. He admits that relapse may occur, but states that persistent treatment often results in a favorable outcome. Radium epilation in long-standing cases of *syccosis vulgaris* is the treatment that Simpson recommends "in careful hands," stating that any slight atrophy of the skin that may be produced is greatly preferred by most patients to the unsightly appearance caused by the syccosis, which usually renders it impossible for them to follow their avocations. Finally, localized *pruritus*, and especially *pruritus ani* is often relieved by radium.

I append the two most striking of Simpson's photographs, being "before and after" pictures of an extensive *nevus vasculosus* (Figs. 24 and 25).

On the whole, as stated in the beginning of this article, my judgment as to the present dermatotherapeutic value of radium has not been much changed by the communications that have appeared during the year. That it is effective—to a certain extent—in some cases and in experienced hands, is undoubted. That there are a few cases in which, from the extent, location, or intractability of the affection, it is the most desirable treatment, may be admitted; as also the value of its painlessness, ease of application, and psychic effect. But the debit side of the account is, unfortunately, a long one.

In the great majority of the cases of *nevus*, *lupus erythematosus*, *lupus vulgaris*, cancer of the skin, *keloid*, etc., the same results, partial or complete, can be gotten with other and safer and cheaper remedies, with solid carbon dioxide, trichloracetic acid, arsenous acid, the curette, the cautery, etc. All advocates of radium at least mention, and several of them specifically warn us of, the dangers of excessive reaction, of atrophies, telangiectases, and intractable ulcerations, from the employment of radium. The difficulties and dangers are exactly the same as are those incidental to the employment of the *x*-rays as a dermatotherapeutic agent; and the conclusion seems justified that the two agents act in very much the same way. I have long ago hazarded the supposition, and experience has thus far justified me, that the curative action of both the *x*-rays and radium is due to the irritation and consecutive inflammation that it occasions, and to little else. There are many other and safer ways of getting this reaction. I have seen and had results as good as any of those recorded from radium in *nevus* (including the

cavernous type), lupus erythematosus, epithelioma, keloid, etc. I am perfectly convinced that the general practitioner need not, at this stage

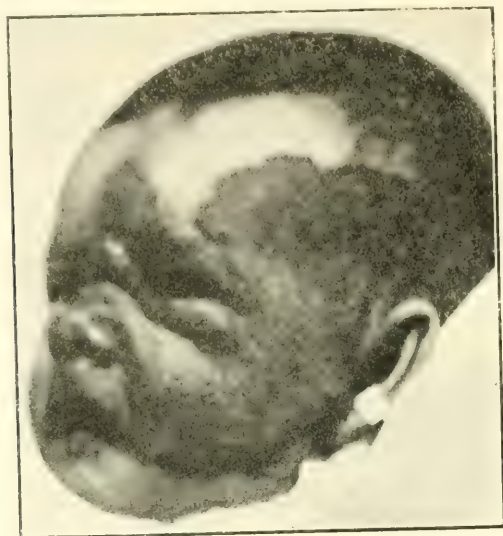


FIG. 24.—Nevus vasculosus before treatment with radium. Age, six weeks. Simpson's case.



FIG. 25.—Nevus vasculosus after treatment with radium. Age, eighteen months. Simpson's case.

of its development, take radium into consideration as a dermatotherapeutic agent; and that even the specialist finds but few cases in which its use is indispensable or even greatly desirable.

Vaccines in Dermatotherapy. When this subject was last treated in these pages¹ some five years ago, the verdict as regards the value of the method was reserved as being "not proven." The lapse of time has demonstrated the wisdom of the decision. Almost every case of acne, furunculosis, etc., that comes into our offices has already had vaccines, either autogenous or stock, at the hands of general practitioners; for the theory of the treatment is enticing, and its application is easy. When we consider how long and arduously we have to struggle with these cases; how we have to employ all manner of local and general measures, and sometimes with unsatisfactory results, small wonder that the idea of curing them with a few hypodermic injections appeals to the practitioner. Of course, it will be claimed, and rightly, that we do not see the successful cases; that only the unsuccessful ones reappear. Two answers are to be made to this. In the first place all the cases are treated with other local and general measures as well as the vaccines; and, as we well know, mild cases respond to the former alone very well indeed. And in the second place vaccines, in the hands of most experts, have not given results satisfactory enough to recommend their general employment.

McDonnell² indeed states that vaccination has run riot in the treatment of acne, which he believes to be essentially due to intestinal fermentation. Regulation of the diet he therefore regards as the most important step in its management. The teeth should be overhauled by a competent dentist; and slow chewing of food should be taught. Sweets should be forbidden, including candy, preserves, cake, pie, ice-cream, and soda water. The following are absolutely forbidden: Breakfast cereals, potatoes, fresh bread, macaroni, apples, bananas, and nuts. For the first two weeks he limits his patient's diet to milk toast, soft-boiled eggs, dry toast, and soup; after that they may take fish, meats, vegetables and fruits (with the exception of those forbidden above), salads, tea, coffee, and milk. Of drugs, McDonnell employs only those capable of holding intestinal fermentation in check to some extent; and of these he believes the best to be ichthyol. He commonly prescribes the following: Aloin, 0.10, ichthyol, 10.0, with a sufficient quantity of licorice powder, to be mixed and divided into 30 capsules, one to be taken after each meal. He does not mention local treatment at all, and apparently does not employ it. This is a rather heroic treatment so far as diet is concerned for an ordinary case of acne, and I doubt if the majority of our patients would stand it.

Davis³ reviews the entire subject of vaccine therapy, and claims that its real role is protective, and not curative.

It is non-specific, and usually, though not necessarily, protein therapy. These foreign proteins and their derivatives may, especially when injected into the veins, occasion a severe chill followed by high fever, leukocytosis, and the appearance of certain changes in the blood, especially the occurrence of ferments. The proteins in question may be

¹ PROGRESSIVE MEDICINE, September, 1912, p. 128.

² Journal of Cutaneous Diseases, February, 1917.

³ Journal of the American Medical Association, January 20, 1917.

derived from disease germs, or they may consist of other animal substances, as serum, proteoses, and milk. After the rather severe reaction, marked improvement or even permanent cure may result in certain diseases. This may be due to the high fever, and to increase in the ferments and leukocytes of the blood; but other factors are probably at work.

Engman and McGarry¹ report two strikingly successful cases of *ringworm of the beard* treated with Strickler's ringworm vaccine. Both were infections with the large-spored ectothrix variety of the parasite; and since all the cases treated by Strickler had been of the small-spored fungus, but little was hoped for from the use of the remedy. Both were extensive cases of long standing, and were kept in the hospital during the experimental treatment. Six ampoules were administered in one, and two in the second case, at intervals of six days. There was a marked febrile, and some local, reaction. Both patients were discharged cured in a few weeks. I append two "before and after" photographs of one of the cases (Figs. 26 and 27).

There is no reason to doubt that in these, as in other cases in which remarkable results have been obtained from vaccines, the general systemic reaction to the foreign protein is an important and perhaps the effective element in the result attained. These parasites are well known to be very sensitive to changes of soil, as witness the facts of isolated contagions where many individuals have been exposed, the cessation of parasitic growth of some forms at puberty, the influence of infections and febrile diseases in inhibiting parasitic growth, or initiating its appearance, etc. The whole subject is yet dark, and requires much further study and observation before it can be said to be firmly seated as a therapeutic procedure. At the present time the employment of vaccines in the treatment of skin diseases is a purely experimental and uncertain matter; it cannot compete with the older and recognized methods of local treatment; and it is certainly not to be recommended to the general practitioner.

Mercury in Verrucæ Planæ. This usually insignificant affection becomes of some moment when the face is affected, when there are scores and hundreds of lesions, and when the patient is a female. Local treatment is unsatisfactory, on account of the multiplicity of the lesions usually present, and the at least temporary disfigurement occasioned by curettage, the cautery, solid carbon dioxide, etc. Hence the suggestions of other means that are made from time to time receive consideration. White,² in connection with a report of certain cases coming under his own observation, briefly recounts the various modes of treatment of flat warts recommended by the various authorities. Crocker confirms the truth of the report by certain French physicians, that repeated doses of magnesium sulphate, 2 or 3 grains for children, a half-dram for adults, three times a day, cause the warts to drop off. Enough should be given to cause two or three evacuations daily. He admits, however, that the

¹ Journal of the American Medical Association, February 17, 1917.

² Journal of Cutaneous Diseases, Including Syphilis, November, 1915.



FIG. 26.—Ringworm of the beard before treatment with ringworm vaccine.
Engman and McGarry's case.

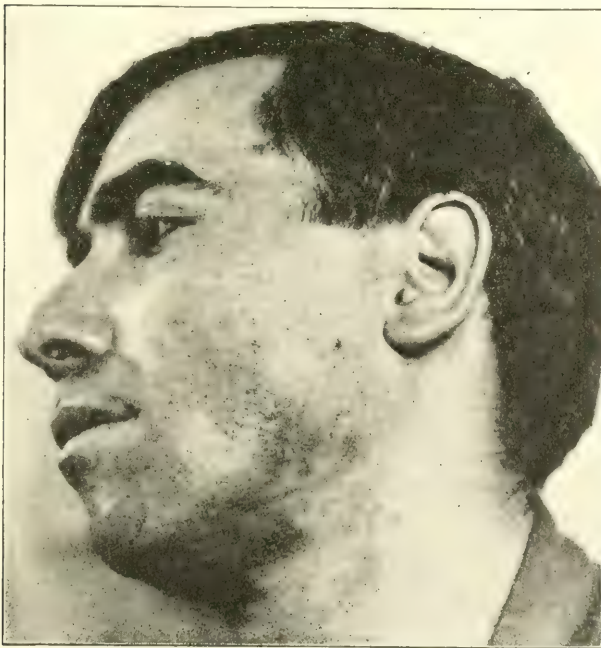


FIG. 27.—Ringworm of the beard after treatment with ringworm vaccine.
Engman and McGarry's case.

medication is not invariably successful; and in my own limited experience I have not found that it does any good. Neisser and Jadassohn say that the usual internal medication, including thuya and magnesium sulphate, has not proved as useful as arsenic in gradually increasing doses (Fowler's solution or Asiatic pills) "the verrucæ planæ can completely fade away undoubtedly (at least very often) in several weeks or months" Schalek believes only in local treatment, electrolysis, excision, or caustics. Dubreuilh says that both arsenic and thuya fail more often than they succeed, and that magnesia is very undependable; he uses the following ointment: Calomel 1; salicylic acid, resorcin, āā 2; lanolin 20. Mraček holds that for the small, flat warts, arsenic is a specific, though it has no effect on the hard warts. But he admits that at times success by this means comes so slowly that he has to resort to curettage in addition. Pusey says that the only reliable treatment is the local one. Normal Walker, while recommending local measures, scissors, solid CO₂, caustics, salicylic acid collodion, etc., says that he has seen two or three hundred flat warts totally disappear after exposures to *x*-rays amounting altogether to one hour. Though generally successful, however, he has seen this treatment fail entirely. Sequiera states that the internal administration of lime-water, half a pint a day, is often followed by disappearance of the warts without any local treatment whatsoever. Saboureaud believes in local treatment alone, and so does Knowles. Kingsbury does not commit himself, saying that both arsenic and sulphate of magnesium are believed by some to be curative; and Jackson does the same. Stellwagon, Ormsby, Hazen, and Schamberg are equally non-committal as to the efficacy of internal medication in the condition.

With this difference of opinions and indefiniteness of statement, White is properly cautious in drawing conclusions from his apparent results. A physician's wife appeared with hundreds of flat warts on her cheeks, neck, and the backs of the hands. Believing, with most of us, that flat warts are due to a protozoön of some kind, he prescribed mercury protiodide pills in a quarter of a grain strength, three times a day; at the same time ordering a salicylic acid ointment. One month later the patient returned, and not a wart was to be seen; and, so far as White knows, none have recurred since.

Since then White has had occasion to treat 2 more cases himself, and to see the drug used in the affection in 4 additional cases by Drs. Oliver and Burns. These 6 undoubted cases of verrucæ planæ juveniles have been subjected to the internal action of mercury, and the disease has apparently been cured, and cured quickly. One additional, but possibly doubtful, case was treated in a similar manner, with a negative result. In a hitherto chronic, intractable, and oftentimes disfiguring condition, the author says, such results are surely noteworthy and are very gratifying.

My own experience, since my attention was drawn to White's article, has been limited to 1 case. The patient, a male adult had hundreds of flat warts over the bearded face; persistent treatment with the micro-cautery had removed very many of them; but from time to time new

ones recurred, or minute lesions grew into visibility; and, of course, the frequently repeated cauterizations caused minute scars and hair-bulb destruction. He was kept on the mercury protiodide treatment for three months steadily, without any apparent change in his condition. Of course, in an affection of unknown origin, which admittedly sometimes disappears rapidly and spontaneously, and in which opinions as to the efficacy of internal treatment varies so much, it is difficult to give advice. But I shall try mercury again in the next case of flat warts that presents itself and it would be well for others to do the same.

SYPHILIS.

A New Mercurial Preparation for Syphilis. Lautman,¹ referring to the fact that the salvarsan preparations have latterly been difficult to obtain and of high cost, says that the profession have fallen back to a large extent on mercury in treating syphilis. Most of us, of course, have never given up the latter drug; and indeed, in the City Hospital of New York, where more cases of severe syphilis are probably treated than in any other one place, there was no salvarsan at all obtainable during the winter of 1915; yet the clinical results attained, at all events, were not noticeably worse than during the previous winter, when the newer drug was still obtainable. Lautman admits that the salicylate of mercury, administered intramuscularly, is still the most popular form of the older remedy; but he agrees with a number of recent observers in stating that the rate of absorption of the insoluble preparation is slow. Strange to say, he claims that it has but little effect on the visible lesions; a statement that will hardly be admitted by the thousands of practitioners who have used the drug in this form for many years past. It is a matter of every-day experience that so far as clinical results are concerned, effects exactly the same can be gotten from either of the two drugs; that sometimes one drug, and sometimes the other, is quicker in its action; and that the best practice is probably that employed by most syphilographers, of using them both in the treatment of a case.

Realizing also the disadvantages of the soluble mercurials in their painfulness when administered in larger doses, the danger of mercurialization, the difficulties of frequent administration, etc., Lautman has endeavored to overcome them and at the same time get the benefits of the slower acting salts by using a soluble salt, the benzoate, in an oily emulsion instead of, as is usual, in a watery solution. He employs an oil emulsion of 10 parts of mercury benzoate and 2 parts of quinine and urea hydrochloride in 100 parts of white liquid petrolatum. The quinine and urea hydrochloride is first ground up with a little of the oil in a mortar; and then, with careful trituration, the benzoate and oil is added, a little at a time. A perfect emulsion results. The injection is administered in the usual way and at the usual site; and the usual precautions to avoid injecting the oily suspension into a vein are employed. One important difference must be made in the instrumentation; an all-glass

¹ Medical Record, January 13, 1917.

syringe must be used. For we are dealing here not with an insoluble mercurial in oil which not only does not attack but actually preserves metallic surfaces; we are using a soluble preparation. Lautman generally gives 1 grain of the benzoate (10 minims of the suspension) at a dose, and repeats this three times a week. He admits that there is some pain for a number of hours after the injection, but it is usually well tolerated; and that there is some lameness on the following day. Painful indurations, he says, are rare.

The authors results were undoubtedly good. He lists 25 cases, of all varieties as to the age of the infection and the nature of the lesion; but all untreated cases, and all with a 4-plus Wassermann reaction. Fifteen injections were given in a course; then, if the Wassermann was still positive, the treatment was continued until the reaction became negative. In no case, he states, was it impossible to make a negative Wassermann positive. In 14 cases this was accomplished in 20 injections or less; in 9 cases it took between 20 and 30 injections, and in 2 cases over 30 injections to accomplish the result. In 18 cases the time required was between five and ten weeks; the other 7 required up to fourteen weeks.

In no case was salvarsan or the iodides employed until the Wassermann became negative. After this occurred, the iodides were used in some cases to help get rid of the more persistent lesions. All the primary and secondary lesions disappeared under treatment. Some of the tertiary lesions cleared up entirely, the others were favorably influenced, but the iodides had to be resorted to. In his conclusions, the author states that while all the Wassermans were successfully changed from positive to negative, "The influence on the existing lesions was very favorable."

Without expressing any opinion as to the value of the benzoate of mercury when used in this form in the treatment of syphilis, there are certain considerations of a more general nature that it seems proper to advert to. To regard the blood test as the only or even the most reliable test of the persistence of a luetic infection is, in my mind, a mistake; it is not even the most important one. Without going into details that would lead us too far here, it is well known that a temporary reversal of the Wassermann is common immediately after a antiluetic course, and especially after mercurial medication. It must be permanent after long intervals of time to render it important. Further, the blood test means nothing at all in the presence of undoubted clinical evidences of the presence of syphilis. A mucous patch, a broad condyloma, and an ulcerated gumma mean syphilis, no matter what the blood result is. It is a dangerous thing that will cause us trouble, and will cause our patients trouble, if we believe, and lead our patients to understand, that a negative blood test alone, made soon after a course of treatment, means anything at all.

Especially is this the case when clinical lesions of syphilis are still present, as was the fact in many of Lautman's cases. Finally, the duration of the treatment required with the new preparation, five to fourteen weeks, the number of injections needed, from 12 to 33, and the fact that after the Wassermann became negative, salvarsan or iodides were needed to complete the clinical cure, is not evidence in favor of

the new form of mercurial administration. Much better and much quicker results can be gotten with the salicylate.

Syphilis without a Chancre. Gaucher¹ remarks that, as the chancre is only the reaction of the epidermis to the inoculation of the specific virus, it is necessarily not seen when infection occurs by some other route. Such cases, though very exceptional, do occur. He recounts 2 cases in which patients were infected in the course of operations, the surgeons having syphilitic mouth lesions at the time; another case in which the surgeon cut his finger deeply while operating on a syphilitic; and still another in which a therapeutic injection was made with the same needle which had just been used on a syphilitic whose disease had not been recognized. In all these cases, the virus was injected directly into the blood current, and the dermic reaction or chancre did not appear. Gaucher also describes a number of instances in which infected semen inoculated the urine wall while the external genitals escaped. Of course, in all these cases there is much room for doubt as to the point of inoculation. Not finding the site, even at the hands of so experienced an observer, is by no means proof positive that one does not exist. We all meet cases occasionally in which it is impossible to determine the site of inoculation; and it is a not infrequent experience to find the lesion only after prolonged and careful search. A chancre of the cervix, for instance, is a lesion that gives very little trouble to its bearer, and may well be unnoticed or its symptoms misinterpreted by its bearer; yet how many of us make a careful ocular examination in these cases? Extragenital chancres, I am convinced, are frequently misinterpreted. Especially is this the case with initial lesions seated far from the mucocutaneous junctures, as in the tonsils.

An experience that I had some years ago cannot be very uncommon. A patient from a neighboring city came to inquire as to the nature of an eruption that had appeared a day or two previously; it was a general macular syphiloderm, and was accompanied by other evidences of secondary syphilis. He had had a bad sore throat some weeks before, for which he had consulted a very competent laryngologist in his home town. A tonsillotomy was done, the wound from which was still unhealed when I saw him, three weeks later; and it was still distinctly and characteristically indurated at the base. Yet no suspicion as to the nature of the tonsillar swelling was harbored. Such a case might well go down on the list as a syphilis without a chancre. And there is no reason to doubt that infection might occur still deeper in the alimentary tract, and be entirely overlooked or misinterpreted. The same holds true, though to a lesser degree, of the other mucosæ communicating with the exterior, even the auditory canal and the nasal passages. Even the supposed placental inoculations are now very generally believed to be inoculations of ordinary type, but so seated as to be readily overlooked. With the exception of the rare direct blood inoculations, as in the cases cited by Gaucher, it is probable that there is always a distinct dermal or mucosal reaction to the implantation of the specific virus, though we do not always discover its site.

¹ Bulletin de l'Académie de médecine, October, 1916.

Syphilis and Pseudohermaphroditism. A case of pseudohermaphroditism with probably heredosyphilitic gummatous ulceration of the genitals has recently been recorded by Gottheil and Goldenthal,¹ which is of interest from various points of view. The patient, Betty W., a negress, fifteen years old, was born in New Jersey, and was admitted to the City Hospital, New York, in the summer of 1916 suffering from an ulcerative affection of the external genitals. She gave a history of rape by a white man four months previously, and ascribed her present trouble to that cause. Examination showed tumefaction and extensive deep ulceration of the labia, perineum, and adjacent regions. A marked abnormality of the genitalia was perceived at once; but the condition of the parts was so bad, and the patient so recalcitrant, that no complete examination could be made at the time. There was no necessity for examination under anesthesia; and, as the ulcerative lesions were evidently gummatous in nature, the patient was put under the ordinary mercury and iodine treatment, with appropriate local measures. In about three weeks the ulcerations were so far healed that further examination could be made. In five weeks they were completely cured, extensive areas of white scar tissue marking their site. Repeated careful examinations were then made, with the following result:

Betty was a dark negress of low intellectual type, five feet and two inches in height. Her general appearance when stripped was distinctly male; the thorax was of the male type with relatively broad shoulders; the abdomen was flat and the hips were narrow. There were no mammary glands of the female type, the nipples and subjacent tissue being less in size than is often seen in distinctly masculine individuals. Her muscular development was mediocre, there was no distinct panniculus adiposus; the lower part of the trunk was masculine in appearance. The mons veneris was well covered with hair; but the hair did not end in a transverse line in the suprapubic region, but was continued irregularly up to the umbilicus. The dorsum nasi was flat, though there were no evidences of past intranasal destructive processes; her lips were thick and prominent. Her mental faculties, though undeveloped, could not be called subnormal for the type and class that she represented. Her voice was distinctly feminine. Her mouth and genitals showed abnormalities that require description in more detail.

Mouth. The palatal vault was extremely high and very narrow, the upper teeth were apparently placed in a double row around the arch (Fig. 28). The dentist of the hospital, Dr. J. Lowenstein, was kind enough to examine the case and to make the cast that is here pictured. He reported in effect that the dental abnormality was due to a simple displacement of the upper external incisors, and an irregular displacement of the molars on both sides. In view of the fact that other developmental abnormalities, hernia, spina bifida, hydrocephalus, polydactylia, ectropia vesicæ, etc., as well as mental defects, have frequently been noted in hermaphrodites, this statement of fact does not help us to understand the condition.

¹ New York Medical Journal, May 19, 1917.

Genitals. As the patient lay in the dorsal position on the examining table, the external genitals were so distinctly male in appearance that

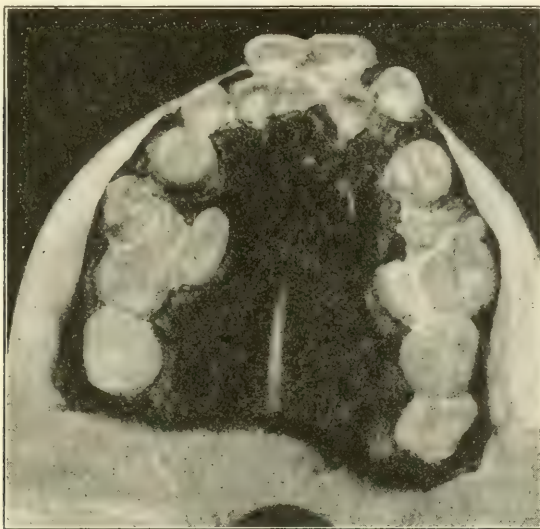


FIG. 28.—Syphilis and pseudohermaphroditism. Cast of upper teeth. Gottheil and Goldenthal's case.

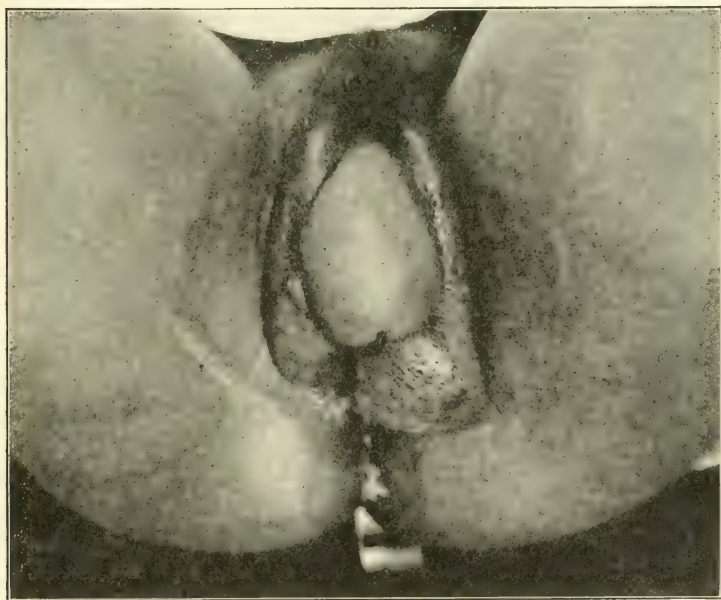


FIG. 29.—Syphilis and pseudohermaphroditism. General view of genitals. Gottheil and Goldenthal's case.

there would be no doubt as to the patient's sex on casual examination (Fig. 29). There was apparently a large scrotum containing the usual

organs, the left half of the bag being considerably larger and more prominent than the right. On top of this lay a very large penis of the usual form; but what was evidently the corpus spongiosum was much

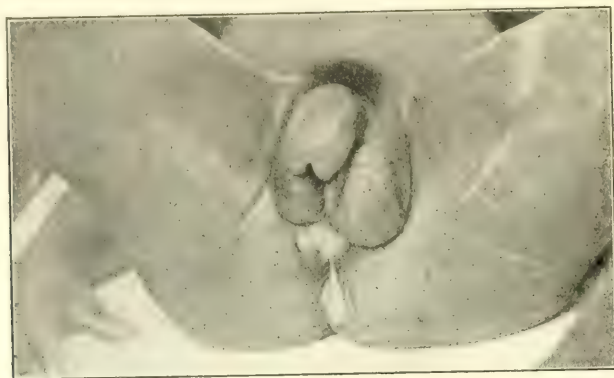


FIG. 30.—Syphilis and pseudohermaphroditism. Gottheil and Goldenthal's case

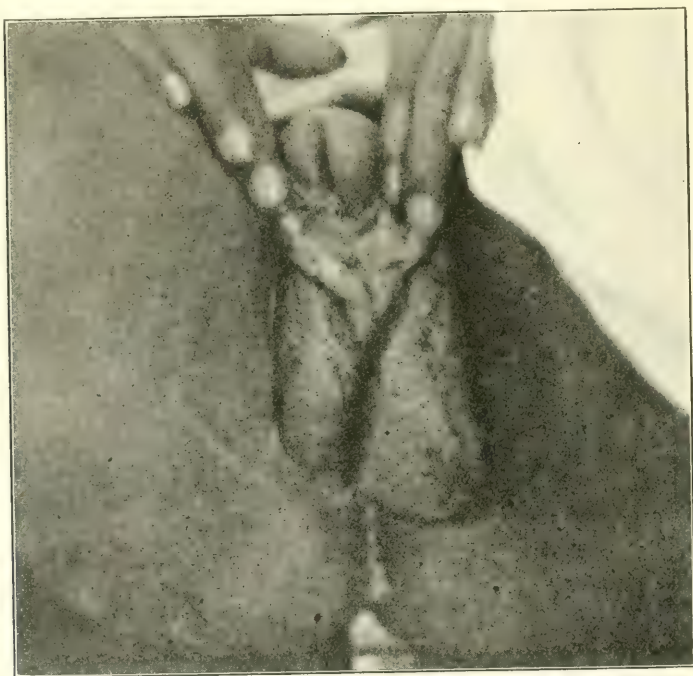


FIG. 31.—Syphilis and pseudohermaphroditism. Hypospadiac "penis," vestibule, clitoris, os. Gottheil and Goldenthal's case.

larger than usual in comparison with the rest of the organ. This penile organ in the flaccid condition was $4\frac{1}{2}$ inches long, measured from its upper base at the symphysis pubis to the tip of the glans; and the glans itself was 3 inches in circumference over its largest diameter. It would be an

abnormally large penis in a true male; and it presented the further abnormality of the disproportionate size of the spongy glans, which made up more than one-half of its length (Fig. 30). When this organ was lifted, an apparently complete hypospadias was present; a urethra was represented by a wide and deep furrow on its posterior surface, ending distally in an open, but well-formed, meatus urinarius, and flattening out proximally into a shallow channel which was lost in what looked like the vestibulum vaginae of the female (Fig. 31). When the penile organ was lifted up there extended downward from the glands on each side two distinct and prominent cords feeling like and doubtless representing the corpora cavernosa; these cords remained side by side, as in the male, down to the root of the organ, and then diverged to enclose the vestibule, being apparently lost in its walls.

The small triangular vestibulum, that was visible when the penis-like organ was raised, contained the true urethral opening, leading by a short canal into the bladder; both in appearance and location it resembled the urethra of the normal female. Just above its orifice was a small protuberance which, under ordinary circumstances, would be taken for a clitoris. Below the urethra was a small oval opening, evidently the orificium vaginae; it admitted, though with difficulty, the introduction of the examining finger. Posterior to this was a small, but apparently normal, perineum, back of which was the anus.

The two halves of the apparent scrotum were completely cleft and, when separated, showed a vestibulum, urethra, introitus vagina perineum, and anus, as above described. These large lateral masses look and feel rather like scrotal tissue than like that of the labia majora; they are covered with coarse corrugated skin, and are quite hard. The left one was much larger than the right; the skin of both has been the seat of a deep ulcerative process; it is thickened and discolored (grayish white). Most careful palpation fails to reveal the presence of any organ in these labial or scrotal masses; nor does firm pressure elicit any of the peculiar sensations which the presence of a testicle or a prolapsed ovary would entail. The masses are insensitive, and were evidently composed of fat and connective tissue. From the upper portion of the left, and larger, labial or scrotal mass, a cord, passing upward and outward to be lost in the inguinal region, could be distinctly felt; this we took to be the remains of the gubernaculum. There were absolutely no traces of labia minora. Vaginal examination, and combined rectal and vaginal palpation showed the presence of a rather short and narrow vagina at the end of which a small, but perfectly distinct, os uteri could be felt. The body of the uterus could be only indistinctly felt, though repeated examinations convinced us of its presence. Uterine adnexa were not demonstrable.

During the six months that Betty had been in the hospital she had menstruated but once, and that scantily; the nurse in charge of the ward is positive that nothing like regular menstruation occurs. At the time of her entrance into the hospital, the labia majora or scrotal halves, the introitus vaginae, the perineum, the perianal region, etc., were the seat of an extensive gummatous ulceration, now represented by brownish-

white scars that show prominently against her dark skin, and by various indurations.

The patient's statements as to her *vita sexualis* were interesting, though they had to be taken with reserve. Her story of a rape by a white man some months previous to her entrance in the hospital as her first sexual experience does not seem likely to be true in an individual of her race and age; sexual life usually begins much earlier. In fact, her accounts at different times were not in accord; since she admits sometimes only one, and at others several, forced cohabitations, and at others describes her own sensations during intercourse. Her statement that the ulcerative lesions for which she came to the hospital were due to the forced intercourse four months before is necessarily incorrect; there were neither history nor signs of early syphilis; the lesions were gummatous, and probably due to hereditary infection; and they certainly had been present for a number of weeks before she came to us. Betty stated that she enjoyed the sexual act with males, that she did not care in that way for females, and that during intercourse the penis-like organ becomes erect. The first statement is probably correct, and so is very likely the last; for the organ is composed of erectile tissue, both spongy and cavernous, as in the male. But the second statement is at variance with the evidence of the nurse in the ward, who positively affirmed that the patient displayed no interest at all in males with whom she was accidentally brought in contact; but that she was very devoted to the females in the ward, fondling them whenever permitted and unchecked, and striving to form close friendships with them. Psychic homosexuality, at all events, was present.

I regard this case as a female, in spite of the absence of certain features, such as labia minora, which are by some believed to be essential for the determination of that sex. And I do so for the reason that a distinct vagina, cervix, and clitoris is present, and probably a uterine body. Besides the absence of any testicular organs in the labia, and the occasional occurrence of a bloody vaginal discharge make for that view. It is one, however, in which distinct differentiation into the male or the female type has occurred only incompletely, with the preponderant change toward the female side. The presence of a hypospadiac penis as well as an approximately normal female urethra and a clitoris does not militate against this view. Development has gone on in the direction of both sexes to an unusual degree, since most pseudohermaphrodites lean much more decidedly than does this one to one or the other sex. The accompanying phenomena of many general male body characteristics, and of sexual inclinations toward the female, are also of interest. And there is little reason to doubt that the hereditary syphilis from which the patient suffers is an important etiological factor, perhaps the determining one, in the abnormal course taken by the developing sexual organs. Developmental abnormalities of the most varied kind have been noted in heredosyphilitics; and disturbances in the normal course of change in the Wolffian bodies and the Müllerian ducts, though not so extensive as in this case, have been recorded from the effects of the luetic infection.

Syphilis Treatment. The literature of this subject has grown so great that a comprehensive review of that of even a single year is impossible. I shall content myself, therefore, with calling attention to the more important developments in this field.

Cole¹ does not employ neosalvarsan, believing that it is much weaker in its effects than salvarsan. He never relies even on the latter alone, always employing weekly injections of gray oil as well. His experience with the Canadian preparation, *diarsenol*, has not been encouraging. He has given some 200 injections of the drug; and he notes, that while it is clinically about as effective as salvarsan, severe and even alarming reactions occur two or three times as frequently as with the latter drug. It has frequently been necessary to keep the patient in the hospital from twenty-four to forty-eight hours, or even a week, after its administration. In fact this operator seems to have had an unusual proportion of severe reactions even after the foreign drug. A sensation of fulness of the head, with marked erythema and swelling of the skin of the face and neck, with occasional involvement of the mucous membranes, were the commonest untoward symptoms. Twenty to 25 per cent. of his cases had chills and fever of varying intensity; 10 to 15 per cent. had emesis, sometimes very violent and occurring before the patients left the operating table. Nausea and diarrhea was also not uncommon. On the other hand, Cole's experience with the *arsenobenzol* prepared by Schamberg at the Dermatological Research Laboratory in Philadelphia has been distinctly satisfactory. Reactions, according to the maker, are due to impurities, probably of the order of nitrites; if care is exercised in the preparation of the drug, there should be little or none of them.

Cole believes that five or six salvarsans and ten to twelve gray oil intramuscular injections are about all that is required in a primary or secondary syphilis to render the blood permanently Wassermann negative; though he admits that the patient should have more or less mercury during the next two or three years. He claims that relapses, as he terms them after the German fashion, but which I prefer to designate as objective symptoms showing the persistence of the infection, are very rare after the salvarsan course; in fact, he has seen but three of them during the last four years, and all of them in patients who had only had two or three salvarsans at irregular intervals and who had neglected the mercury treatment. I am afraid that this is a dangerous dictum to promulgate. Salvarsan or arsenobenzol does not relieve the patient of the necessity for prolonged mercurial treatment. It is especially useful to eliminate quickly symptoms that are dangerous to the patient or to his surroundings; but mercury is needed to cure the disease, if it is to be cured at all, and even the most ardent salvarsan advocates employ it. Further, the infected patient requires several salvarsan and a number of mercury courses extending over several years, no matter what the blood reaction may be.

In older syphilis, especially where the cerebrospinal system is involved, several courses of salvarsan with mercury have given Cole excellent

¹ Ohio State Medical Journal, January, 1917.

results in practically every case. In tabetics, however, the treatment was unsatisfactory. Intraspinal treatment has not, in his hands, been useful; though he does not discard it as a method of last resort.

Finally, in an addendum since the article was written, Cole states that the Canadian diarsenol, at his solicitation, has been improved. He has since given a thousand injections, and now recommends it highly.

In a further monograph, Cole¹ briefly recounts his experiences with sodium cacodylate in the treatment of syphilis. He employed it in 10 carefully observed cases; and his conclusions were decidedly against the drug. It was worthless as a spirocheticide; its action on papular and nodular syphilides was very slight, not to be compared with that of mercury or iodine; in mucous patches it was worthless; and its effect on the blood reaction was negligible.

In the shape of a preliminary report, Sinclair² records an attempt to treat cerebrospinal syphilis by the intra-arterial infusion of neosalvarsan. Since the amount of salvarsan that reaches the brain by the ordinary intravenous method of administration is necessarily very small, and since that is also the case with the intraspinal method of administration, Sinclair injected neosalvarsan into the carotid arteries of dogs, giving as much as 0.9 without fatal result. The internal carotid gives off no branches until it enters the skull to form the circle of Willis; and the choroid artery, a branch of the internal carotid, supplies the choroid plexus, which secretes the cerebrospinal fluid. Hence, neosalvarsan infused into the carotid artery is at once distributed to the brain in general, and at the same time is directly fed into the secretory apparatus of the cerebrospinal fluid. Occasion to employ the treatment in the human being presented itself in the person of a patient with a classical paresis and a 4-plus Wassermann who had been infected with syphilis some seven years before. Four 0.9 neosalvarsan intravenous injections did him no good at all; so Sinclair exposed the carotid and injected 0.55 of neosalvarsan into the blood stream. There was practically no reaction, and the wound healed satisfactorily. According to the patient's relatives, there was decided mental improvement, and they desire to have the treatment repeated. It is too early, as Sinclair admits, to draw any conclusions; and many cases must be treated before so severe and serious a therapeutic measure can be recommended. I merely here record the attempt.

Alderson³ also prefers the old to neosalvarsan, and he has been entirely satisfied with the arsenobenzol supplied by the Philadelphia Dermatological Research Laboratory. Like almost all other authorities, he regards the employment of mercury in conjunction with the arsenic as indispensable, as also is potassium iodide after the first year of the disease.

Schamberg, Kolmer, and Raiziss report on the administration of arsenobenzol by mouth. Previous investigations on animals had led to the following results:

¹ Journal of the American Medical Association, December 30, 1916.

² Medical Times, January, 1917.

³ Journal of the American Medical Association, December 23, 1916.

(a) Salvarsan can be administered in pills, capsules, or solution to animals in dosages of from 0.02 to 0.03 per kilogram of body weight without producing toxic symptoms.

(b) After the oral administration of salvarsan, arsenic is found in the bile and the urine at the end of twenty-four hours, but it disappears at the end of seventy-two hours.

(c) Twenty-four hours after the oral administration of salvarsan to cats, the number of bacteria in the intestinal tract appears to be diminished.

(d) Salvarsan administered by mouth, and also intravenously, to rabbits in doses approximating those employed in human beings does not produce, at least within the ninety-six hours following its administration, any appreciable microscopic changes in the important viscera.

It was also ascertained that, with the exception of a little vomiting and diarrhea in some cases, salvarsan could be given by mouth in doses up to 0.6 to human subjects without producing toxic symptoms. This dosage, however, was too feeble therapeutically to warrant its use by this route. An extended series of experiments was then undertaken on rats and rabbits, animals infected with experimental trypanosomiasis, the *Trypanosoma equiperdum*, the organism producing dourine or horse syphilis, being chosen for the purpose. It is well known that these parasites react chemotherapeutically similarly to the *Spirocheta pallida*, and offer, therefore, a most excellent therapeutic criterion of the effect of various agents. The conclusions of the authors are as follows:

1. Experiments on animals have demonstrated that arsenobenzol can be administered by the mouth in solution or in capsules and become absorbed into the blood.

2. The proof that absorption takes place is evidenced by the fact that a distinct destructive influence on trypanosomes in the blood of experimentally infected animals is exerted.

3. In a general way, it may be stated that about one-ninth or one-tenth of the dose required in solution by the mouth produces an equivalent effect intravenously.

4. Experimental studies on animals demonstrate that arsenobenzol can be administered in capsule form over long periods of time without harmful results.

5. Clinically, it has been found that the drug may be given in doses of 30 mg. ($\frac{1}{2}$ grain) three times a day for many weeks without producing disturbing symptoms except mild digestive distress, and this only in a relatively small proportion of cases.

6. Administered by mouth, arsenobenzol is capable of producing a curative influence on the lesions of syphilis. The effect, however, is much less vigorous than when the drug is administered intravenously.

7. We do not advise the use of arsenobenzol by the mouth as a routine, inasmuch as there are much more efficient avenues of administration. Its use is to be reserved for patients who, for some

reason, cannot take the drug by intravenous infusion or intramuscular injection.

Naegeli,¹ in a long article on the modern treatment of syphilis, gives some interesting details as to the treatment of heredosyphilitic children with salvarsan. He gives 0.005 gm. of salvarsan per kilogram of body weight once a week intravenously, or he employs neosalvarsan intramuscularly, giving a dose proportionate to the body weight as compared with that of the adult. Of course in all cases the mercurial treatment must not be neglected. Baginski holds that the intravenous treatment is too dangerous for children, and uses the intramuscular method. Attempts to give salvarsan to infants in the mothers' milk, or in goats' milk, or by means of serum from horses treated with salvarsan have been abandoned, mainly on account of the uncertainty of the dosage. A vein in the head or neck may be utilized occasionally for the injection.

Trimble and Rothwell² have treated a series of 110 cases, representing all the various stages of syphilis with salvarsan and neosalvarsan, 41 receiving the former and 69 the latter drug. As far as possible, the methods of administration, dosage, control by blood examinations, etc., was the same in both series of cases. In every case mercurial treatment was instituted only after the last arsenical injection was given. The authors classify their conclusions under three heads:

1. Clinical Results: Salvarsan and neosalvarsan were entirely equal in therapeutic value. Mucous membrane lesions faded more rapidly than could have been expected under the older mercurial medication; the papular type of skin eruption, however, receded with no greater promptitude than had been the case heretofore.

2. Reactions: Nearly all patients taking salvarsan or neosalvarsan had them, and more commonly after the older than after the newer preparation. They were sometimes severe, but never bad enough to cause the treatment to be stopped; and the authors think that the large amount of water employed may have had something to do with their occurrence.

3. Serological Results: Negative Wassermanns were gotten in only 17 patients, 14 of whom had neo- and three old salvarsan. This is not, as the authors remark, a very satisfactory result, more especially as it was attained in several of the cases only after prolonged mercurial treatment.

Ellis³ and Moody⁴ both record mishaps from the use of these arsenical preparations. The latter had a number of cases in which headache, nausea, diarrhea and vomiting occurred, and one death from 0.9 neosalvarsan. The former has noticed marked toxic symptoms in most of the cases in which he used salvarsan purchased during the latter part of last year. There is other evidence to the effect that the salvarsan received of late from abroad has not been up to the standard of former years.

¹ *Therapeutische Monatshefte*, September, 1916, No. 9.

² *Journal of the American Medical Association*, December 13, 1916.

³ *Ibidem.*, December 9, 1916.

⁴ *Ibidem.*

Smith's article on the diagnosis and treatment of syphilis is not suitable for review here; it can be recommended, however, as giving a good general survey of what has been done in the field since 1905. The author is inclined, however, to be more optimistic than most syphilographers as to the practical results attained. Ormsby, however, takes the same general view. He states that the limitations to the use of salvarsan and neosalvarsan are comparatively few; that mercury and iodine must, however, be used in conjunction with them; that either the old or the new salvarsan can be employed, but that the old is the more potent preparation; and that only the discovery of a more potent agent will displace them.

OBSTETRICS.

By EDWARD P. DAVIS, M.D.

THE result of the European war is seen in the great diminution or cessation of scientific investigation in Europe. Laboratory and experimental research in obstetrics has practically ceased and the comparatively few papers now published are upon clinical subjects only. The waste of human life is calling attention to the necessity for conserving the population and saving infant life and widespread efforts are being made to this end.

PREGNANCY.

The Diagnosis in Pregnancy. At present we hear little, or nothing, of the Abderhalden test, and in the diagnosis of pregnancy reliance is placed practically upon the clinical phenomena only. Among these, one of the most interesting is arterial tension.

Doljan,¹ has studied the MODIFICATIONS WHICH PREGNANCY, LABOR AND THE PUERPERAL STATE PRODUCE IN THE CIRCULATION. The clinical material was obtained in the Obstetrical Clinic of Bucharest, and the instrument used and method was the sphygmometric oscilimetry of Pachon.

The author found that, during the entire duration of pregnancy, there is normally a hypotension. This gives place to hypertension so soon as the uterus contracts, whether it be during labor or during abortion. When the uterus has been emptied, hypertension gives place to hypotension. The nephritis of pregnancy invariably produces hypotension. Both maximum and minimum values are reduced from the first months of pregnancy in a considerable extent. Thus, maxima of 8 cm. Hg. and minima of 5, 4, and 3 have been observed; so great a variation is seen in pregnancy only.

The volume of the uterus seems to have nothing to do with the hypotension of pregnancy, for this is often greatest in the first months of gestation. Both maximum and minimum values are greatly changed by uterine contractions. When pregnancy and the puerperal state are over, weeks and even months may be required for a return to strictly normal conditions.

Irving² has studied the *systolic blood-pressure in pregnancy* in 5000 consecutive cases in the pregnancy clinic of the Boston Lying-In Hospital. He finds that in 80 per cent. of pregnant women, the blood-pressure ranges from 100 to 130; blood-pressure may be below 100 once or more in 9 per cent. When the blood-pressure is below 90, it

¹ Arch. de mal. du cœur, 1916, ix, 388.

² Journal of the American Medical Association, March 25, 1916.

does not mean that the patient will necessarily have shock and hemorrhage at the time of confinement. A considerable number, 11 per cent., have blood-pressure above 130 once or more. Nationality, parity and age seem to have some influence on the blood-pressure. In those over thirty years, high blood-pressure is not so often a sign of toxemia as in those younger. High blood-pressure is a better index of toxemia than albuminuria, and usually develops earlier. The degree of elevation is a more accurate symptom than the degree of albuminuria, although both are of cardinal importance. It is not uncommon to find isolated cases of high blood-pressure without albuminuria or toxemia. These respond well to free catharsis. Some remain elevated in spite of treatment and seem to be normal to the patients having this condition. A progressively rising blood-pressure, even from a low level, though it may never reach the danger-point, is significant of approaching toxemia. With a blood-pressure over 150, the suspicion of toxemia is very strong. In eclampsia, the pressure is usually above 160 and in all cases of toxemia there is both albuminuria and high blood-pressure. In two-thirds of the cases that developed convulsions, the patients had absolutely neglected advice and refused to return to the clinic. If proper precautions could be taken with all cases, eclampsia should be largely prevented. The value of blood-pressure as a diagnostic sign of pregnancy is emphasized by these researches.

THE TESTS OF THE FUNCTION OF THE KIDNEYS. Treupel¹ believes that in testing the functions of the kidneys the best results are obtained by using those substances which are normally present in the urine. While the technic is more complicated, the results are more reliable than when lactose and potassium iodide are employed. In a doubtful case, all methods may be required. A simple and practical method consists in putting the patient upon a standard diet, then giving 1600 c.c. of water which should be eliminated, if the patient is in health, in twelve hours. A test dose of 0.5 gm. of potassium iodide given by mouth should be eliminated normally in fifty to sixty hours. Sodium chloride in test dose of 10 gm. may be used. 20 c.c. of lactose, 10 per cent. solution, injected intravenously, should be eliminated normally at the latest in 6 hours and to recognize this the urine is examined by the polarimeter. Patients occasionally manifest chills and fever following this intravenous injection. If more than 5 to 7 are required for the elimination of lactose, it is proven that the glomeruli of the kidney are involved. When the potassium iodide is not eliminated in 60 hours, the suspicion is that the tubules of the kidney are diseased.

Carlini,² in Bossi's Clinic at Genoa, has made researches to test the value of the Abderhalden method of diagnosing pregnancy. He employed the method of dialysis and found that it frequently gave a positive reaction during the puerperal state, and also in various diseased conditions of the uterus and ovaries. The more recent method proposed by Abderhalden, known as the colorimeter, has not been sufficiently tested to form a definite idea of its value.

¹ Deutsch. med. Wchnschr., February 10, xlii, No. 6.

² Annali di Ostetricia e Ginecologia, March 31, 1916.

Van Slyke, Losee and Villehur have studied the quantitative test of Abderhalden's reaction and give their results in the *American Journal of Obstetrics*, February, 1916. They find that in spite of the interest and study excited by Abderhalden's researches, no agreement has been reached by clinical observers concerning its true value. They ascribe this to the fact that the method of dialysis is that usually employed. This is not quantitative, and depends for its final verdict on the matching of squares, leaving the result peculiarly open to subjective influence on the part of the manipulator. Other methods have been used to a less extent, but have not proven positive. The writers have endeavored to provide a quantitative method sufficiently accurate, simple and specific for proctoclysis so that definite results, free from subjective influence, might be obtained. They studied pregnant sera as compared with normal sera. They prepared placenta first, according to Abderhalden's directions, second, by practically the same method but dried the placenta at room temperature with pressure of 0.5 mm., pulverized and preserved dry in sterile bottles. The third method was that recommended by Prego as an improvement over Abderhalden. This yields also a dry, pulverized material. The placenta were all taken directly from the operating room of the Lying-In Hospital in New York to the Laboratory, and the removal of the blood was begun while the placenta were still warm. The tissues were finally perfectly white and free from blood. They were also free from soluble products containing amino-nitrogen, which was determined by incubating them for sixteen hours with distilled water and testing the water for amino-nitrogen. After considerable experiment the method finally followed consisted in incubating placental tissue for 16 hours with 2 c.c. of serum, serum being incubated along as a control. The undigested protein was removed by coagulation, and amino-nitrogen in the filtrate was determined. The extent to which the volume of nitrogen gas obtained after incubation of serum plus placenta surpassed that obtained after incubation of serum alone, gave the direct measure of the degree to which protein digestion had occurred from the action of the serum on the placenta.

The writers conclude that practically free serum, whether from a pregnant or non-pregnant individual, showed a definite measurable degree of digestion when incubated with placental tissue. There was a wide range of individual variation. The conclusion is that the Abderhalden reaction is practically useless in diagnosis in pregnancy. The individual variations of both pregnant and non-pregnant sera make the results from both overlap so completely as to render utilization of the reaction, even with a quantitative technic, absolutely impracticable for either positive or negative diagnosis even of pregnancy. These conclusions were reached after a year of exceedingly careful and thorough work upon the subject.

DIAGNOSIS DURING PREGNANCY BY PELVIMETRY BY THE X-RAYS. Ponzio¹ describes and illustrates a method of measuring the pelvis by the use of the x-rays. By taking certain accessible measurements and an x-ray picture showing the curve of the sacropubis, he is enabled to

¹ Annali di Ostetricia e Ginecologia, March 31, 1916.

measure the inaccessible portions of the pelvis. He quotes Manges' method as a definite advance over the old technic of this subject.

THE WASSERMANN REACTION IN PREGNANCY. Judd¹ employed the Wassermann reaction 892 times in the obstetrical wards of the King's County Hospital. Of these, 821 were negative and 71.7—9 per cent.—were positive. The majority of the positive patients examined had no visible lesion, and would have been overlooked had the Wassermann reaction not been taken. Those having a positive reaction were treated by salvarsan, mercury by inunctions and hypodermics. Patients entering the hospital in labor and having a positive Wassermann reaction were treated before they were discharged from the hospital.

The case of a woman who had been treated by salicylate of mercury by hypodermic injections before admission to the hospital is described and the patient presented the characteristic lesions of syphilis on entering the hospital. She had a 4-plus Wassermann reaction. By vigorous treatment, the child was saved. Of the children born living, all were born without lesions, and but 12 of 277 had positive Wassermann reaction. Another case illustrates the familiar fact that treatment by salvarsan may be followed by the death of the child.

In taking the histories of these patients, it was found that the history of miscarriage was of doubtful value. The majority of those having positive reactions had miscarriage one or more times, while the remainder were either primigravidae or had living children and no miscarriages. It was difficult, in case of miscarriage, to get a history pointing clearly to syphilis as the cause. Usually, if the mother is treated during pregnancy, the infant has a negative reaction, but this does not mean that the child may not develop syphilis. Of 35 mothers whose infants showed signs of syphilis, 9 had negative reaction and 26 positive.

If the mother gives a negative reaction, the child is reasonably safe. In cases of congenital syphilis of infants, the children showing symptoms give positive reactions. Of living children born of syphilitic mothers, nearly 10 per cent. give negative reaction. The doctrine of latent syphilis was fully borne out in their experiments. Infants born of mothers late in the maternal disease are very apt to have hemorrhage and jaundice. In the treatment of these cases, transfusion of whole blood was used successfully.

Commiskey² has used the Wassermann test as a routine in 1822 mothers and 1074 newborn infants. He believes that it is of the greatest value in detecting syphilis in pregnant women. He infers that syphilis has little influence on the length of gestation but unquestionably produces a much higher percentage of stillborn children. It is unjustifiable to use blood or serum from the umbilical cord of an infant for the treatment of others without a Wassermann test having first been done on both the fetal and the mother's blood. Children born of mothers having positive Wassermann reactions have a mortality rate four times as great during the first ten days of life as the mortality rate of children in whom the Wassermann reaction has been negative.

¹ American Journal of the Medical Sciences, January, 1916.

² American Journal of Obstetrics, April, 1916.

Falls and Moore¹ have studied the Wassermann reaction in pregnancy and have found that the condition is usually latent and that as a diagnostic measure it is very valuable. If diagnosis can be made promptly and treatment instituted, the number of syphilitic children will decrease and the general health of infants will be greatly benefited. Most syphilitic mothers are ignorant of their condition, and therefore have no proper treatment. In 160 pregnant women, 11.3 per cent. gave a positive Wassermann reaction; 10.6 per cent. of married women gave a positive reaction. The highest percentage of positive tests was in negro women—28.5 per cent.

THE POSITIVE DIAGNOSIS OF EARLY PREGNANCY may be at times exceedingly difficult or impossible. Recently, nitrous oxide and oxygen anesthesia has been urged as a perfectly safe anesthetic for examination and manipulations. While, in the majority of cases, the writer has seen no bad effects following the use of nitrous oxide and oxygen, it occasionally produces severe struggling and in some patients does not bring about sufficient relaxation to make a thorough bimanual examination satisfactory. It is sometimes necessary to supplement its action with that of ether.

In diagnosing early pregnancy, the points for practical consideration of decided value are the shape, size, contour and consistency of the uterus, and the presence or absence of the lower uterine segment. If the lower uterine segment can be clearly made out, a diagnosis of pregnancy is reasonably certain. In primiparous women, changes in the breasts and thyroids may confirm the results of pelvic examination. Upon these points must rest the diagnosis of early intra-uterine pregnancy.

In ectopic gestation, anesthesia is required for examination, and even with its aid a positive result may not be obtained. A final resort to abdominal section is frequently the safest and most satisfactory method.

The Hygiene of Pregnancy. PREMATEMNITY PRACTICE AT THE EDINBURGH ROYAL MATERNITY HOSPITAL. Ballantyne² describes the results of his work in the care of pregnant women for seven consecutive years. He describes the points gathered in the histories taken at the Out-patient Clinic and speaks of the value of the work of the nurses who visit the pregnant women in their homes. In the early ward work in 32 cases receiving attention during pregnancy, there was but 1 death, and this patient was admitted suffering from croupous pneumonia. Among the complications encountered were eclampsia, albuminuria, 3 serious heart lesions and other minor conditions.

During the subsequent quarter, a larger pathological range of cases was observed and the results were correspondingly satisfactory. Seventeen of the mothers remained in the hospital for delivery; of these, 14 gave birth to children that lived. As the experience of the prenatal work accumulated, the results demonstrated the practical value of the work. Toxemia was frequently recognized and promptly treated. Contracted pelvises were detected and labor was induced or Cesarean section performed. Among the more interesting of the cases was 1 of

¹ Journal of the American Medical Association, August 19, 1916,

² British Medical Journal, February 2, 1916.

obstinate chlorosis, 1 of acute anemia, 1 of gastric ulcer, and 1 of extensive thrombosis.

At a meeting of the Section of Obstetrics and Gynecology of the Royal Society of Medicine, a discussion of the care of pregnant women was opened by Moore.¹ He stated that an average of 3500 deaths from childbirth occurred in England and Wales each year; a far greater number endured preventable suffering and disability. The majority of deaths occurred from septic infection, hemorrhage and toxemia. Of secondary importance were embolism and pernicious nausea. Many of these cases could have been saved with prompt preventive treatment. To improve the condition of pregnant women, he advocated notification of pregnancy. On receiving the notification, the woman could be examined and her surroundings considered by qualified physicians. With the woman's consent, a small fee was paid to the doctor or midwife for the notification. For treatment, cases were referred to the family doctor. In 1536 births that had been notified, in 156 pregnancies, or about 10 per cent., 130 of the pregnancies were uncomplicated and 20 had complications. The birth-rate of the country was declining to an alarming extent; the death-rate had fallen, but could not be much further reduced.

Routh gave the experience at the Queen Charlotte Hospital where, during 1914, there were 557 cases of albuminuria admitted. There were 3 per cent. stillbirths among the children and in the year of 1914, 100, among which were 26 macerated fetuses. In the effort to save the unborn children, there were now about 750 centers of prenatal care established in Great Britain and Ireland. He thought prematernity beds should be in every hospital. He doubted the practical value of compulsory notification because of the ignorance and resistance of the mother.

Berkeley drew attention to the scope of medical work at the maternity centers and stated that it should include a thorough physical examination to the patient and drew attention to the importance of the work of midwives. He believed that 50 per cent. of all pregnant women and 75 per cent. of working women engaged midwives to attend them. The scheme for care which had been proposed included general supervision, attendance at a center, treatment of all cases requiring medical attendance, the patient referred to the center being allowed to choose any doctor on the list which she might prefer.

Kerr would divide pregnant women into three groups:

1. Those well-to-do who could secure care.
2. A large body of the lower middle-class containing women who often drift into a serious state that could probably be looked after without much difficulty.
3. The last class in the social scale. Reason was hopeless with these and legislation was the only remedy. He believed that such should be compelled to notify their doctors of their pregnant condition and that after confinement this notification should be forwarded by the doctor to the medical officer of health. The penalty for failing to notify should be a reduction of the maternity benefit.

¹ British Medical Journal, November 11, 1916.

In Glasgow, the scheme included maternity clinics with smaller maternity centers in various districts.

Kiwosky, of Petrograd, gave an account of the maternity situation in Russia. In the 50 central provinces, the birth-rate had declined from 49.9 per thousand, 1894-1896, to 43.1 per thousand, and the death-rate from 36.3 per thousand to 27.4 per thousand. The natural increase in the population was 15.7 per thousand. The mortality among children under one year was 27.2 per cent., as compared with 7.1 per cent. in Sweden and 6.7 per cent. in Norway. In 5,249,677 births during 1913, there were 870,000 miscarriages and stillborn children. Russia needed 37,000 beds for lying-in women, and 6000 midwives, instead of the present number 14,361 in the year of 1912. 7,330,507 children had been born living, 25,240 in the lying-in hospitals. Ninety-five per cent. of the confinements occurred without obstetrical help whatever.

THE NATIONAL INSTITUTE OF MOTHER CRAFT. A memorial to those who have fallen in the European war in the English Army is proposed in a projected national institute of mother craft.¹ The committee in charge includes leading pediatricians and medical women. It is not intended to be a vast school for mothers, but to be the headquarters of all information and material for the training of students and workers concerned in the welfare of mothers and children. On the ground floor of the building will be a day nursery, nursery schools for children and school for mothers, and an infant clinic. The first floor will be for administrative purposes, while the second floor will contain a museum and exhibition rooms, reference and reading library, observation ward for resident babies and students' training department. The third floor will be devoted to laboratory and research work. The aim of the originators of the institute is to make it a place where every effective preventive agency shall be put into operation to combat infant, antenatal and maternal mortality. All the scattered activities will be collected under one roof, and every department will be organized by specialists. The cost of the institute is estimated at \$1,000,000 at least.

CARE OF PREGNANT WOMEN. Donald² draws attention to the importance of antenatal treatment in the interests of the unborn child and to maintain the health of the mother. In large towns, this has been the feature of the work in the maternity hospitals.

In estimating those conditions which are of the most importance during pregnancy, the acute infections seriously influence pregnancy and greatly aggravates certain conditions, such as diseases of the heart and kidneys.

Of all conditions which pertain especially to pregnancy, toxemia is the most important and dangerous. Abnormalities of the uterus and of the ovum are far less important than toxemia. Obviously, these are susceptible to great improvement or cure under proper medical care. Cases of severe toxemia require hospital treatment.

Compulsory notification of pregnancy is urged by some and its utility denied by others. To be of use, notification must be made early, if

¹ Letters to Journal of the American Medical Association, January 27, 1917.

² British Medical Journal, July 8, 1916.

possible, to avoid abortion which is so frequent at the third and fourth months. The advocates of notification draw attention to the great lessening of infant mortality in some villages where this has been carried out, but they do not recognize the fact that in large cities notification would be very difficult to obtain.

Practically, pregnant women should be taught how to take care of themselves and warned of certain dangers. Schools for mothers, or places where such advice is given, are of especial value. Improvement in the education and training of midwives is also important, and this might well include examination of urine for the prompt detection of toxemia. Medical students should receive a more thorough training in practical obstetrics and greater facilities should be given the general practitioner for postgraduate instruction. A short time spent in a modern maternity hospital might greatly aid them to improve their methods of diagnosis and treatment. The important pathological problems of obstetrics are related especially to abortion and stillbirth, and should be studied in well-equipped clinical laboratories in connection with maternity hospitals. While large cities may be provided with maternity hospitals, such should also be established in smaller places and even in country districts. This would result in not only improving the care for women but also the education for the practising physician. A solution of the whole problem lies in education and research.

Pyelitis of Pregnancy. Danforth¹ reports a case of pyelitis in a woman four months pregnant who had severe pain over the right kidney with some obstruction in the right ureter. By turning the patient on her left side, the catheter passed up without difficulty, a large flow of urine was discharged and the patient felt much more comfortable. Evidently, the pressure of the uterus upon the ureter prevented the discharge of urine.

To determine what *relation existed between bacteria present in the bladders of normal pregnant women and the pyelitis of pregnancy*, urine was taken from the bladders of normal pregnant women on entering the hospital. This was done under carefully antiseptic precautions with 50 patients. Cultures were made, and of the 50, 32 showed a pure growth of staphylococcus; 2 had pure culture of colon bacillus; 3 colon bacillus and staphylococcus, and 13 gave no growth. A further effort in 14 cases was made to ascertain whether colon bacillus is not more frequently present. Of the 14, 8 gave pure cultures of staphylococcus, 4 were negative. In the second series of 14 cases, 7 yielded staphylococcus; 1 gave pseudodiphtheritic bacillus and 1 an unclassified bacillus. In 64 cultures in all, the colon bacillus was found five times.

It seems highly probable that the staphylococcus, so often found in the urine of pregnant women, is an organism of a low virulence.

It is considered most likely that the colon bacillus finds its way into the pelvis of the kidney from the blood stream.

As regards *treatment*, the use of posture is of great value. When the right kidney is affected, if the patient be placed upon the right side or

¹ Surgery, Gynecology and Obstetrics, June, 1916.

upon the abdomen, the uterus will gravitate away from the right ureter and allow the kidney to drain.

Water should be used in large quantities and urotropin. Vaccines are not reliable. Catheterization of the ureters is a valuable aid in diagnosis and in severe cases the pelvis of the kidney may be irrigated through the catheter with a solution of nitrate of silver or other antiseptic. In practising cystoscopy, every effort should be made to avoid violence and disturbing the bladder. The knee-chest posture cannot be employed because in this the uterus falls forward upon the bladder. Drainage of the kidney has been successfully performed. If, however, these cases are recognized early and promptly treated, surgical interference can often be avoided.

The reviewer recently had occasion to operate upon his sixth case of pyelitis of pregnancy treated by nephrotomy. The patient was a multipara brought by her physician to the Jefferson Hospital, who was found to be six months pregnant with living child. She was a fairly nourished, strongly built woman, and complained of severe pain in the right lumbar region, extending down and toward the front. The urine was acid and contained abundant colon bacillus in pure culture. There were abundant leukocytes in the urine and the patient was having severe chills, with high fever. She had been receiving medical treatment for some time.

On cutting down upon the kidney, it was found to be considerably enlarged and much softer than normal. On passing a suture through the two ends of the convex surface, the kidney tissue was so soft that the sutures would not hold. The finger of the gloved hand was carried readily through the substance to the pelvis of the kidney and a free flow of blood and urine followed. Gauze was then packed about the kidney and a strand of gauze carried into the pelvis. The extremities of the wound were closed by suture. The patient was placed upon her right side during the greater part of the time with the head and shoulders somewhat raised. She made a somewhat slow and satisfactory recovery and was taken home by her family against the advice of the hospital staff before her convalescence was completely established. The pregnancy remained uninterrupted.

The reviewer's experience with drainage of the kidney for pyelitis of pregnancy has been satisfactory. Patients have recovered and pregnancy has not been interrupted.

Abdominal Pregnancy. Solomons¹ calls attention to the difficulty of diagnosis in abdominal pregnancy and illustrates it by the report of a case.

The patient had been married for ten years and had not previously been pregnant. Four months before admission to the hospital, she had pain in the abdomen, dysuria, frequency of micturition and vomiting. There was severe pain in the lower abdomen while walking. The patient was very frail, had menstruated irregularly and gave no history of previous illness or operation.

¹ Surgery, Gynecology and Obstetrics, September, 1916.

A tumor was found in the abdomen, extending to the umbilicus. On internal examination the uterus was retroverted, and the tumor in the abdomen seemed to be connected with it. There was a soft, cystic swelling in the posterior and lateral fornices also connected with the abdominal tumor and uterus. Fetal parts and movements could be distinguished both by abdominal and vaginal examination. The differential diagnosis seemed to lie between intra-uterine pregnancy with ovarian cyst, and retroverted pregnant uterus with ovarian cyst. Abdominal pregnancy was thought of but not considered probable.

Upon opening the abdomen, a tumor very adherent to the surrounding tissue was found, stretching a little beyond the umbilicus. This was very adherent and in the left iliac region the finger entered the sac and a fetal foot was extracted. There was some old blood on the right side and much fresh hemorrhage from the separated parts of the sac. On removing the tumor, it was found that the fetus and placenta had been removed and that the right tube was also in the mass. The uterus, left tube and both ovaries were left as before. The patient's condition was such that further investigation could not be carried out. She rallied from the operation, passing through a mild attack of cystitis, and on the fourteenth day passed by rectum a cast of the rectum. The patient finally made a good recovery.

The reviewer on one occasion was asked to see a patient who gave the following history. Her first pregnancy apparently proceeded normally except for repeated attacks of pain which seemed to threaten miscarriage. Between the eighth and ninth month the patient developed toxemia and had an attack of eclampsia from which she recovered without the occurrence of labor. Following this, fetal movements ceased, the size of the abdomen somewhat decreased but an abdominal tumor persisted. She sought relief because the size and weight of the tumor made her uncomfortable.

Upon examination, the tumor seemed connected with the uterus, was of irregular outline and of nodular consistency. It was thought that it might be a fibroid uterus or possibly an abdominal pregnancy. On opening the abdomen, a mummified fetus was found in a sac lying among the intestines. The amniotic liquid had been absorbed and the placenta still remained adherent to the abdominal tissues. The fetus was removed, the cord cut close to the placenta and the fetal sac tamponed with gauze and the greater part of the abdominal wound closed. The gauze was gradually removed, the patient making a good recovery.

Pregnancy Complicated by Abnormal Conditions Other than of the Genito-urinary Organs. PREGNANCY COMPLICATED BY TUMOR OF THE JAW. Graves and Prince¹ describe the case of a negro woman, aged twenty-two, who had two children living and well. Three and a half years before coming under observation, when the patient was three months pregnant, she noticed for the first time a red growth which appeared behind the incisor teeth in the upper jaw at the margin of the gums and teeth. The growth grew forward between the teeth and

¹ American Journal of Obstetrics, February, 1917.

then laterally to the first molar during the pregnancy. After she was delivered, the size of the growth subsided somewhat. It was then removed with the cautery. It did not recur until she became pregnant, when it grew rapidly during pregnancy and again subsided. The tumor again became active during pregnancy for the third time and extended from the incisor teeth beyond the wisdom teeth on both sides, especially the right.

On examination there was a firm, vesicular mass the size of a thumb extending from the left upper incisor to the right upper wisdom tooth and a smaller mass was present on the left side. The growth was attached to the upper jaw. It seemed attached at the junction of the teeth and gums and extended between the teeth on the inside and outside of the teeth so that many were completely covered by the growth and all were loosened in their sockets. The tumor bled easily on pressure or handling.

At operation, the growth was excised as far as possible and the remainder removed by cautery. Electric cautery knives were used on the mass between the teeth. The patient refused to have her teeth removed and more could not be done.

Examination a week after the operation showed bright red nodules at the base of the upper right wisdom tooth and between the upper central and left incisors. These buds were the size of a pin-head.

In the Obstetrical Department of the Philadelphia General Hospital the reviewer recently had the case of an ill-nourished, anemic young white woman who had a red, vesicular tumor on the upper jaw which bled easily and was of considerable prominence. This had been diagnosed an epulis. As the patient was near term, it was thought wise to induce labor and when she was convalescent to send her to the Department of Oral Surgery for operation.

THE INTERNAL SECRETION OF THE PANCREAS IN ITS RELATION TO PREGNANCY. Falco¹ has made investigations to determine the relation between the secretion of the pancreas and pregnancy. He found that Langan's layer of cells in the pregnant uterus presents much the histological appearance of some of the tissues of the pancreas. The entire removal of the pancreas during pregnancy does not produce glycosuria, and the glycosuria of pregnancy and the puerperal state does not seem to be caused by any nitrogenous element in the internal secretion of the fetal pancreas but seems to be the effect of the utilization of sugar in the organism on the part of the fetus and is caused by substances in the maternal blood or by a placental ferment. Experiments conducted to vary the daily ingestion of substances acted upon by the pancreas seems to show that the placenta has a considerable function in disposing of hydrocarbons.

Pregnancy Complicated by Acidosis. Ely and Lindeman² believe that the symptoms arising in acidosis are due entirely to the withdrawal of the alkaline reserve from the blood and from the plasma bathing the cells. The unoxidized toxic products that are intermediary in metabo-

¹ *Annali di Ostetricia e Ginecologia*, 1916, No. 1.

² *American Journal of Obstetrics*, July, 1916.

lism are frequently found in children during starvation, diabetes, and to a slight extent in the mild fevers. Cyclic vomiting is an example of this. When the acidosis of pregnancy is studied, it can be clearly demonstrated that this arises from deficient action of the liver. The demand for alkalis is so great that ammonia from the blood is withdrawn before it is converted into urea and hence a high ammonia content in the blood is a symptom of acidosis. The degree is best measured by Van Slyke's method to determine the carbon dioxide absorption capacity of the blood plasma. The symptoms will depend entirely upon the degree of the retention of acid substances in the organism. The main important alkali which can be employed in neutralization of substances in acidosis is sodium carbonate. The transfusion of blood may prove valuable in these cases and would increase the alkaline and oxygen capacity of the patient.

The case of a woman, aged twenty-four, in whose family there was a marked history of diabetes is described. The patient became pregnant soon after marriage, and immediately had pernicious nausea and vomiting. A varying amount of acetone and diacetic acid were present in the urine. No blood analyses were made. The patient had, at about term, a normal labor, the child has been artificially fed and has had symptoms of cyclic vomiting and acidosis of childhood. During the second pregnancy, acidosis again occurred; efforts to control it by alkalis and irrigation of the colon were without effect. The patient became so profoundly depressed that at the thirteenth week of pregnancy, the uterus was emptied. This seemed to have no effect upon the vomiting nor upon the general condition. The patient was then treated by transfusion of blood. For twenty-four hours before transfusion, the donor of the blood was saturated with large doses of bicarbonate of soda. A very extraordinary improvement in the condition of the patient followed, and a second transfusion was given. The patient ultimately made a good recovery. A month after transfusion, the blood-urea had increased to three times the amount present during the starvation period. The patient had lost much weight. She was given a high protein diet and began to gain rapidly.

The method of syringe transfusion is comparatively simple and safe, and is especially adapted for such cases as these.

Emge¹ publishes the results of his investigations conducted in the Hospital of the University of California on this subject. The report is preliminary and based upon 68 cases. The method used was Van Slyke's which determines the percentage of CO₂ in the plasma. The endeavor was made to group the cases according to the number of gestations, the weeks of the present pregnancy, age of the patient, amount of nausea and vomiting in the present and in past pregnancies, with the hope that by this method some uniformity in CO₂ tension would be found. Such, however, was lacking. The first 18 or 20 weeks of pregnancy may present results identical with those of the last weeks, and wide variations may exist in the blood readings in these cases.

¹ American Journal of Obstetrics, November, 1916.

In 61 cases there were but 2 which did not show a decrease in CO_2 tension and it seems fair to infer that, as a rule, this condition exists in the great majority of uterine pregnancies.

The blood plasma of 25, of the 61 cases, was investigated after delivery. All but 6 regained normal, or at least rose above 50. When the cases are reviewed, it is found that acidosis is present in the great majority of uterine pregnancies and that this can be demonstrated by the study of CO_2 tension in the blood plasma. This should lead to caution in ascribing too much importance to the condition of acidosis in pathological cases.

Hemolytic Anemia in Pregnancy. Esch¹ describes very fully cases of anemia which closely resembled the pernicious type, but which he thinks do not strictly belong under this head. Three of these patients died and in only 3 was there hemorrhage in the retina or enlargement of the spleen. While the blood findings closely resemble those of the true pernicious anemia, the etiology and course of the disease were widely different. The lipoidemia which accompanies pregnancy is the factor responsible for this condition. That it is hemolytic is shown from the hemoglobinuria and destruction of blood in the placenta. This occurs from the pathological exaggeration of natural hemolysis or by the reduction in the resisting power of the red corpuscles. The processes which seem to be secondary in compensating are observed in blood marrow, while the destruction of the blood manifested by jaundice and discharge of coloring matter is a primary condition. In these patients the anemia is observed after the first half of pregnancy. It is interesting to know that these patients show little appreciation of suffering and scarcely seem conscious of the pain caused by uterine contractions. When the patient begins to improve, she usually gains rapidly. So far as these cases could be traced, in but 1 did true pernicious anemia develop a long time afterward. Labor occurred on the day when the patient entered the hospital in 2 cases and only 1 patient was in the hospital as long as two weeks before the birth of her child. Nothing seemed to improve these patients except labor, and that was usually spontaneous and occurred prematurely. From this, one might naturally infer that the best treatment would be the induction of labor. A good result is not always obtained because these patients are especially prone to infection, and resist treatment. The children are poorly developed and readily yield to infection. Arsenic is by far the most valuable remedy for this condition and gives much better results than iron.

In 5 of the cases, intramuscular injections of blood were administered without result in 2 and with marked improvement in 2; in 1 case the result of the injection seemed prompt and exceedingly favorable. One patient had, in all, 440 c.c. of defibrinated blood in eight injections. After the second of these, the hemoglobin increased from 9 to 27 per cent. in twelve days. The red cells greatly increased; the general condition was much improved. The hemoglobin had reached 60 per cent. by the end of the fourth month.

¹ Ztschr. f. Geburtsh. u. Gynäk., No. 1, lxxiv, 79.

The Leukocytes in Pregnancy, Labor and the Puerperal State. Baer¹ has studied this subject in the Michael Reese Maternity of Chicago. He found that in pregnancy a leukocytosis exists, slight in amount, appearing in the ninth month, most marked in primiparæ. During primiparous labor, leukocytes average 18,255, and, should labor last beyond twenty-four hours, the leukocytosis is considerably increased. It is less marked in those in a second labor, and slight in women who have borne more than three children. The height of the curve in primiparæ and multiparæ is reached on the first day after labor; then there is a rapid and constant decline to the tenth day when the curve is about at the normal level. The establishment of lactation does not influence the leukocyte count in most cases. In primiparæ, on the fourth day there is a slight secondary elevation of 1500 to 2000. There seems to be no influence exerted by age except in young primiparæ under twenty, and in them the leukocytosis is higher than in any other group of patients. When a differential study is made, the increase is found chiefly in the polymorphonuclear neutrophiles and the condition returns to normal by the third day of the puerperal period. There is also an absence of eosinophiles in about half the cases in labor, but they return in normal proportions on the first day of the puerperal period. Lymphocytes, large and small transitional types, and mast cells show nothing unusual. The Arneeth method of analysis showed a displacement toward the left, *i. e.*, toward classes 2 and 3, but this was so varied that no essential deductions could be made from this fact.

Pregnancy Complicated by Cholelithiasis. Finkelstone² reports the case of a multipara who sought medical aid because she was bleeding from the vagina, and passing clots. The perineum had been torn in a previous labor, was without muscle and full of fine holes from the skin into the vagina. There was also a rectocele. The patient had had the perineum repaired at the time of the labor and also secondary operation. The uterus was prolapsed, the cervix partly open and easily dilated, and the vagina was full of clots. Abortion was inevitable and speedily followed, the fetus being three and a half months. After the patient became convalescent, she was operated upon.

The cervix was dilated, the pelvic floor repaired, the uterus suspended and the appendix removed. During her convalescence, the patient was given calomel which set up a gastric irritation. After sitting up in bed, the patient complained of pain in the chest, and vomited. This pain returned afterward with vomiting. The urine examination was negative. The patient was not jaundiced, but again complained later of pain in the right upper abdomen. Examination showed no leukocytosis. A diagnosis was made of cholecystitis, and the patient was somewhat relieved by hot applications. Her condition gradually improved and she left the hospital. Later, she was seen in a pregnant condition and had repeated attacks of gall-stone colic and cholecystitis. The patient would not submit to operation and passed out of observation. She went into other hands where operation was urged but declined,

¹ Surgery, Gynecology and Obstetrics, November, 1916.

² American Journal of Obstetrics, November, 1916.

and, finally, when seven months pregnant, she consented to operation. The gall-bladder was opened and 86 small stones removed. The fistula healed in twenty-four days. The patient was later delivered of a full-term, well-nourished child. When seen later, she again complained of pain in the right upper abdomen, and a diagnosis of cholecystitis was made. The pain was more severe than any which she had had before operation. Examination by x-rays indicated a gastric or duodenal ulcer. After several days of severe illness, with vomiting, clay-colored stools and jaundice, the patient was operated upon and a hard pancreas was found, resulting from chronic pancreatitis with an enlarged gall-bladder. Adhesions were broken up, the gall-bladder removed and the duodenum drained. On examination, the gall-bladder was thickened and had a small stone embedded in the inner wall of its neck.

Function of the Liver during Pregnancy. Litzenberg¹ made tests for the presence of urobilinogen and urobilin in the urine of healthy pregnant patients in the Laboratory of the Department of Obstetrics and Gynecology of the University of Minnesota. He found that these substances are absent from the urine of healthy pregnant patients except in quantities too small to detect by ordinary methods. When they can be clearly demonstrated, their presence means increased destruction of blood or insufficient action of the liver as a rule. In 31 per cent. of cases examined, these substances were present in the urine and all causations but pregnancy could be ruled out in but 25 per cent. of patients. In view of these facts, it seems reasonable to suppose that there is a liver of pregnancy which acts deficiently. The most probable causes for this condition are congestion and toxemia.

Pregnancy and Labor Complicated by Diseases of the Heart. Hussey² reviews the literature of this subject and reports several illustrative cases. One was a primipara, twenty-four years of age, in the third month who had suffered from chorea when a child and had symptoms of heart disease for a year. Her thyroid gland was somewhat enlarged, but the heart was normal in size and the circulation was good. There was mitral stenosis with regurgitation. The blood-pressure was above normal and there was a trace of albumin in the urine. Her heart muscle, sounds and compensation were perfect. For these reasons pregnancy was not interrupted, and it was decided to let the patient go to term and to deliver her by Cesarean section followed by sterilization.

Another case was that of a multipara, in her thirteenth pregnancy, in labor and suffering greatly from dyspnea and cyanosis. There was a loud, blowing, systolic murmur at the apex, transmitted to the axilla. There were abundant rales over the bases of the lungs. The membranes were tense and bulging, and the patient was evidently in labor. She was kept under the influence of morphine and hyoscine, digitalis was given freely and labor allowed to proceed. After four hours, triplets were born. The patient made a good recovery and was able to do housework.

PREGNANCY AT NINE MONTHS COMPLICATED BY RHEUMATIC MYOCARDITIS. The conditions were such that it was thought best to avoid

¹ American Journal of Obstetrics, February, 1916.

² Ibidem, August, 1916.

labor, as the patient was not in condition to go on indefinitely to labor. She was given morphine and hyoscine and under light ether anesthesia was delivered by Cesarean section. The tubes were excised to prevent future pregnancy. She recovered without interruption and the action of the heart greatly improved.

A case of chronic endocarditis and mitral insufficiency was treated by rest and heart tonics, and then labor was induced by inserting a tube into the uterus. When she came to the hospital, the condition was threatening, and nothing could be attempted until she had improved under treatment. The patient was given small doses of morphine and hyoscine and large doses of digitalis. A small, stillborn fetus was expelled after six hours of labor. The patient subsequently became much better.

The case of a woman with small, flat pelvis and contracted outlet is described. She had also mitral stenosis with imperfect compensation and the bases of both lungs were congested. An attack of acute pulmonary edema showed the seriousness of her condition. Under anesthesia with morphine and hyoscine and local anesthesia, it was possible to deliver the child by section with very little shock to the mother. The baby lived and the mother improved sufficiently to be able to do manual work.

Each case of pregnancy, labor or the puerperal state must be studied carefully on its own merits. Factors of especial importance are the condition of the heart muscle and the reserve force of the heart. Delivery by operation is the most conservative treatment because it attacks the reserve powers of the patient less. Sterilization should be frequently performed in these cases. The mortality of 12 to 50 per cent. often reported is much in excess of the facts.

Case of Intra-uterine Scarlet Fever. Liddell and Tangye¹ report the case of a woman having five children in whose family scarlet fever developed. The mother was at full-term pregnancy and expecting confinement at any time. Scarlet fever broke out among the children and, although the mother was warned, contact was undoubtedly not entirely avoided. The mother came into spontaneous labor and a living child was born which showed free desquamation over the trunk and limbs. This continued for several days and the urine showed distinct trace of albumin. Otherwise, the child was healthy and did well. The mother had felt uncomfortable during the last weeks of her pregnancy and complained of a burning pain inside the body. She had no sore throat or rash, and a normal temperature. The mother was positive that in childhood she had a severe attack of scarlet fever.

The mother evidently had been protected by her previous infection.

Pregnancy in Tuberculous Women. C. C. Norris² gives the result of his observations at the Phipps Institute regarding the effect of pregnancy upon tuberculous women.

He finds that the combination is a common one and that pulmonary tuberculosis exerts little or no influence against conception. So far as

¹ British Medical Journal, September 10, 1916.

² American Journal of Obstetrics, June, 1916.

the *course of pregnancy* is concerned, pulmonary tuberculosis has little influence. In the advanced stages, it may tend to produce abortion, miscarriage or premature labor. Of cases that are mild and quiescent, 20 per cent. are worse after pregnancy, labor and puerperal state, while among advanced patients 70 per cent. are made worse by pregnancy and labor. A tuberculous woman is in more danger after marriage than a tuberculous man because of the complications caused by pregnancy. Women who have pulmonary tuberculosis should not marry unless the pulmonary lesions have been quiescent for a considerable time. Tuberculous women should not become pregnant unless the disease is in the first stage, and has been quiescent for at least two years. In attempting to estimate the *result of pregnancy* upon the given case of tuberculosis, each patient must be studied individually, every factor must be critically observed in order to make a prognosis. If the disease manifests a tendency to increase rapidly in severity and the patient is in pregnancy earlier than five months, the uterus should be immediately emptied. This will not immediately benefit the pulmonary condition, but will greatly improve the prognosis. From 65 to 70 per cent. of cases prior to five months are definitely improved by this procedure, provided good after-treatment is given. Sterilization is rarely justifiable. After the fifth month of pregnancy, it is better to treat the case expectantly, making labor as easy as possible. The patient should not be allowed to go over term, but premature labor induced two weeks before term, and forceps or version should be used as indicated. Infants should not nurse tuberculous mothers and every precaution should be taken to avoid infection. The best hygienic and dietetic treatment are required for these cases. They should be kept under close observation and examined by competent physicians regularly and frequently. In the great majority, the tuberculosis precedes the pregnancy. When the symptoms are first manifested during pregnancy, the infection probably occurred before conception, and an exacerbation during pregnancy has directed attention to the pulmonary condition.

Value of High Carbohydrate Diet and Oxygen as Applied to Pre-eclamptic Toxemia. Lavake¹ has studied this subject in the Obstetric Clinic of the University of Minnesota. He experimented upon rats and made thorough microscopic studies of the liver. He found that lack of oxygen without circulative poisoning causes no apparent change in the staining reactions of the central cells of the liver lobule, at least after twenty-five to thirty-six hours. In cases of chloroform poisoning and necrosis in the periphery, when the kidneys of animals dead from chloroform poisoning were studied, degeneration of the epithelium of the renal tubules was present but the lesions were not as well-marked as in the liver. In animals that were suffocated, changes in the liver and kidneys were less than in those destroyed by acute toxemia. The result of the investigation seems to show that high carbohydrate diet may be of marked value in pre-eclamptic toxemia and that the administration of oxygen, or treatment in the open air, may have a rational basis of support.

¹ American Journal of Obstetrics, September, 1916.

The Control of Nausea and Vomiting of Pregnancy. J. C. Hirst¹ has employed soluble corpus luteum powder, $\frac{1}{3}$ grain, in ampoules with 16 minims of salt solution saturated with chlorbutanol for local anesthesia. This amount is equal to $2\frac{1}{2}$ grains of desiccated corpora lutea, and was given by hypodermic injection to control the nausea and vomiting of early pregnancy. This was used in 25 consecutive cases, and was successful in 21; in 4 it failed completely, and, of these patients, one had goiter and another a retroverted pregnant uterus; the third refused treatment shortly after the beginning; the fourth failed to benefit by the treatment after 12 injections, and so it was discontinued. In these patients the smallest number of doses in any successful case was 4; the largest 42. A dose of 1 c.c. every other day for 5 or 6 doses was found to be a good method of administration. In pernicious nausea where the patient is severely ill, 1 c.c. twice daily, or even more, may be administered. The injection was made into the deltoid muscle, and, in preparing for the injection, alcohol should not be used to disinfect the skin because of its influence on the animal extract. A glass syringe is preferable and every precaution must be taken to avoid infection.

Toxemia of Pregnancy. Lossee and Van Slyke² conclude, from their studies, that the nature of the toxin or toxins causing this condition remains unknown. The toxemia of pregnancy cannot be attributed to failure in diamination of the amino acids, nor to the moderate degree of acidosis which is present. There is no satisfactory explanation of the functional disturbance in this condition. The constancy of the low urea ratios in the urine in eclampsia, and the high ammonia in the urine in pernicious vomiting, indicate that the nitrogen distribution of the urine is a most valuable element in the diagnosis of the toxemias of pregnancy and in differentiating them from such conditions as nephritis and transitory gastric disorders.

RARER FORMS OF TOXEMIA OF PREGNANCY. Hornstein³ reports the case of a primipara who had a severe attack of *chorea*. The patient was excited by the least disturbance; the taking of food was difficult, and sleep was irregular and disturbed. There were mild attacks of unconsciousness, little headache, no vomiting, the bowels moved daily, and there was no disturbance in the action of the kidneys. Blood examination was negative save for anemia. The temperature was 99.5° F.; blood-pressure 125 mm. mercury. The patient was at first treated by complete rest in bed, forced feeding, administration of arsenic, bromide, chloral and iron, and, at night, opium. There was no improvement, and pregnancy was terminated by the use of a gauze pack. After this the patient rapidly recovered.

A case of *polyneuritis* in a patient 7 months pregnant is also reported. When first seen, the extremities were paralyzed and more or less atrophied, and there was very little power in the voluntary muscles. The power of speech varied and at times was absent. There was no facial paralysis and no convulsions. The Wassermann test was negative.

¹ Journal of the American Medical Association, December 16, 1916.

² American Journal of the Medical Sciences, January, 1917.

³ American Journal of Obstetrics, August, 1916.

The patient was treated by electricity, and went to labor, when she was delivered by forceps. There was little, or no, improvement after labor.

In the *American Journal of Obstetrics*, November, 1916, Kosmak reports an interesting case of *toxemia in pregnancy following thyroideectomy*. After the operation, the patient had irregular and intermittent uterine hemorrhage. She was found to be neurotic, with moderate exophthalmos. The breasts were hard, with slight trace of secretion. There was slight tenderness in the left iliac region. The nausea and vomiting were partly corrected with great difficulty and the patient suffered severely from neuralgic pain. As pregnancy advanced, she had a variety of nervous disturbances, followed by temporary improvement. Then nausea and vomiting returned. There was dizziness, with disturbance of vision, and swelling of the hands and feet. The urine remained practically normal, although the specific gravity was above the average. Thinking that possibly deficient thyroid secretion had something to do with the case, thyroid extract was given in small doses continuously, but no effect could be observed. The patient thought that she felt better while taking the thyroid extract, but this could not be confirmed. Shortly before the normal termination of pregnancy, the action of the kidneys began to fail. There was swelling in the extremities, reduction in the amount of urine, with the presence of albumin, granular and hyaline casts. An attempt was made to induce labor by introducing bags, but this was only partly successful. The head failed to engage, and as there was considerable liquor amnii present, the membranes were ruptured. The head remained at the pelvic brim with the occiput posterior. The patient continued to vomit and had severe occipital headache. The vagina was poorly developed and it was evident that delivery through the vagina would be exceedingly difficult and dangerous. Accordingly, extraperitoneal section under gas and oxygen anesthesia was performed. One-half ampoule of pituitrin was to be given as the uterus was being excised, but, through an error, this was administered before the abdomen was opened. When the womb was excised, it was found to be in a state of tonic contraction and it was exceedingly difficult to deliver the child. The child was dead. The mother did fairly well and made a fairly good recovery. During convalescence, the headache disappeared, the urine increased in amount and the general condition improved. Within three weeks after the delivery of the child there was another attack of nephritis. The case is interesting because it was doubtful whether the symptoms of toxemia during pregnancy were due to disturbed thyroid function or whether they existed independently. Although the pelvis was of normal dimensions, other conditions made it necessary to deliver the patient by section.

THE INFLUENCE OF PRESSURE ON THE BRAIN IN CAUSING ECLAMPSIA. Zangemeister¹ interprets the symptoms of eclampsia as resulting from pressure on the brain and believes that in many cases this proves fatal independently of convulsions. Should this assumption be correct,

¹ Ztschr. f. Geburtsh. u. Gynäk., xxxix, No. 1.

it might be of service in the treatment, for it is possible to lessen pressure upon the brain by counter-irritation and other agencies.

TREATMENT OF ECLAMPSIA. Kuipe and Donnelly¹ give the result of their treatment of eclampsia in 83 cases by means other than radical operation. The plan of treatment embraced lavage of the stomach, 2 ounces of castor oil given through the stomach-tube, sweating for 20 and 30 minutes, morphine, $\frac{1}{2}$ grain hypodermically if convulsions are violent or frequent; after the first sweat, hypodermoclysis, followed by the injection of salt solution into the rectum between subsequent sweatings. If the systolic blood-pressure was over 180, and if the diastolic pressure was high, venesection was practised. Ten minims of veratrum viride was given, followed by $\frac{1}{100}$ grain of nitroglycerin every 4 hours. The membranes were punctured if the patient was pregnant or in labor, and no other operative interference to hasten delivery was practised. As a rule, labor terminated spontaneously in from 8 to 10 hours.

Of the 83 cases of severe toxemia, 48 had convulsions before delivery; 17 had convulsions after delivery only, of whom 4 died—a mortality of 16.66 per cent. There were 10 cases admitted in various periods of pregnancy suffering from severe toxemia and all the symptoms of impending eclamptic convulsions. These were relieved by eliminative treatment. Two patients were delivered by vaginal Cesarean section, with only 1 death immediately following delivery. Six cases died within a few hours after admission and after delivery, of whom 4 were deeply comatose when brought to the hospital. One patient died in a convulsion after the birth of the child; another, who had been delivered before being brought to the hospital, died suddenly from cerebral embolism. Among these patients were 4 who previously had eclampsia, 1 in two former pregnancies. In 1 case craniotomy was performed. Toxemia and nephritis developed in 1 patient who died in the hospital one month after admission.

The total mortality was 16.8 per cent. Excluding cases dying within 24 hours after admission, the mortality was 6 per cent.

PUERPERAL ECLAMPSIA. Schult² gives the results of his observations in the Colonial Hospital, Port of Spain, Trinidad, on the *occurrence of eclampsia*. So far as statistics are concerned, the percentage of eclampsia in Port of Spain is 1 in 58.64, and in the entire Colony of Trinidad 1 in 99.36. Chronic nephritis is very common and albuminuria is frequently present in pregnant women. This was found more often in multiparæ than in primiparæ. In common with other observers, the writer found eclampsia more frequent in primiparæ than in multiparæ and that twin pregnancy predisposed to its occurrence. While the ratio of eclamptic cases to the number of deliveries was 1 in 23; in twin pregnancy 1 in 10 had eclampsia. So far as the age of the patients was concerned, the youngest was 14 and the oldest 42. It is interesting to note that most of the patients admitted to the hospital lived upon an exclusively vegetable diet, so that the use of meat had no influence in causing albuminuria or eclampsia. The temperature of the region varies

¹ American Journal of Obstetrics, July, 1916.

² Journal of Obstetrics and Gynecology of the British Empire, 1916, No. 678.

from 86° F. to 67° F. The average humidity was 81. The smallest number of cases of eclampsia occurred at the end of the dry season and at the beginning of the wet weather. More than one-third of these patients had their convulsions after the birth of the child. The mortality for the mother was 22 per cent.; for the fetus, 34 per cent. Four patients recovered from eclampsia without coming into labor, of whom 3 went to term, while 1 was delivered prematurely. Two primiparae and 1 multipara had active mental disturbance after the birth of the child, and it was necessary to send 1 case to an asylum for treatment. These patients had many and violent convulsions. A full-term child, apparently healthy, born of an eclamptic mother died 17 hours after birth after convulsions. In the absence of an autopsy, an exact diagnosis could not be made.

The interruption to laboratory investigation caused by the European situation has caused temporarily to stop the detailed study of toxemia and eclampsia. The majority, however, consider the pernicious nausea of pregnancy and the fulminant toxemia, with convulsions of later pregnancy, as one and the same process at different stages. The fallacy of delivering all cases by immediate operation is widely recognized, and the majority of obstetricians avoid active interference when the cervix is not partly dilated or dilatable. It is curious that, so far as we know, no effort has been made to apply the morphine-scopolamine treatment to eclampsia, and yet, if this disease is one essentially of the nervous system, why should this method not be almost specific? Nor have we heard that nitrous oxide and oxygen is of great value in controlling the convulsions.

In the early stages of toxemia, in the first months of pregnancy, that treatment will be most successful which puts the patient at absolute rest and reinforces the immunizing substances in her blood. This becomes largely a matter of good nursing, and drugs are of very little value for these cases. When the balance begins to turn against the patient, the interruption of pregnancy must be promptly carried out. All depressing influences, as dislocation of the uterus and local foci of irritation, must be dealt with properly, but the main issue is the patient's ability to destroy the exuberant and budding fetal tissue.

In the last months of pregnancy, the condition calling for the most prompt and vigorous treatment is that of poisons accumulating in the body. Here the prompt withdrawal of poisoned blood, followed by the introduction of salt solution, is especially valuable. The significance of convulsions is now more accurately appreciated, and the fact is recognized that in themselves they have little to do with the ultimate termination of the case. It is recognized that immediate operation is unjustifiable, and that every effort should be made to assist the spontaneous expulsion of the child with the least possible damage and danger to the mother. It is also observed that the fetus shares in the mother's toxic condition, and that, although it may be born apparently healthy and fairly vigorous, it may succumb to toxemia with, or without, convulsions very promptly. This fact is a strong argument against immediate delivery by operation done in the interest of the child.

Our constant study of this subject shows us that no one clinical symptom is of absolutely decisive importance. The obstetrician must take all into consideration in estimating the danger with threatened eclampsia.

Some Clinical Aspects of Double Uterus. Handfield-Jones¹ reports the case of a patient who requested an examination because she feared some abnormality in the pelvic organs. A definite septum was found in the median line, with two perfectly developed vaginal canals. There was a separate cervix and uterus communicating with each one. The writer states that he has seen several patients with double uterus who have borne children, and, in one, the condition was not suspected by the attending physician. The writer also alludes to a case reported in the *Journal of Obstetrics and Gynecology*, January, 1913, of a patient who had a complete double set of generative organs and bore a child first from one and then from the other.

He also describes the case of a multipara whom he saw in consultation 10 days after the birth of her third child. The lochial discharge had been profuse and, for 3 days, offensive. The temperature had risen above 103° F. and the patient had all the symptoms of sepsis. The uterine cavity had been carefully irrigated with iodized water but without improvement.

On examination, the uterus was larger than normal and its upper part irregular in outline. With the patient under an anesthetic, an ordinary uterus was found upon the left side, but on the right side the finger passed into a smaller cavity in which was a mass about the size of an apple. This was removed, and found to consist of the membrane of an early pregnancy mixed up with old blood clots. This mass was offensive and undergoing decomposition. After its removal the smaller cavity was copiously irrigated with bichloride, 1-1000. Evidently there had been two pregnancies, one of which had gone to term and the other a pregnancy in which the embryo had died in the early months of its existence.

The second case, a multipara, had missed two periods. There had been a copious hemorrhage and the patient had been apparently threatened with abortion. The blood loss, however, continued, and the womb was enlarged the size of a two months' pregnancy. The patient was highly nervous and the abdomen was fat.

As the hemorrhage continued, it was decided to explore the uterus under an anesthetic. It was found that there were two separate cervixes and behind what had been thought to be the only uterine body was another mass evidently a second uterine body probably containing a growing ovum. On using a curette, some fungoid mucous membrane was brought away. The patient made a good recovery, went to full term and bore a living child. The writer believes that this was a case of menstruation from one uterine cavity while pregnancy was going on in the other. This suggests the interesting possibility of superfetation.

The third case was a multipara who had hemorrhage from the kid-

¹ *Journal of Obstetrics and Gynecology of British Empire*, June-August, 1916.

neys and was operated upon. The result was unsatisfactory. Pregnancy, however, supervened, but it was thought inadvisable to allow this to proceed, and, accordingly, the cervix was dilated under anesthesia and twin fetal sacs about the tenth week of gestation were removed. About 4 months afterward the patient noted that her abdomen was steadily increasing in size and thought that she had felt quickening about four weeks previously. When seen in consultation, the attending physician stated that he had completely emptied the uterus and that pregnancy was practically impossible.

On examination, the uterus was slightly above the umbilicus and fetal movements could be felt. Vaginal examination confirmed this opinion. Bimanual examination showed that on the left of the uterus there was another body apparently the enlargement of the uterine fundus and that it was probable that the patient was pregnant in one horn of a double uterus. There was but one cervix. The patient went to term and was delivered of a normal child.

The interesting point in the case is the fact that the patient had a triple conception.

In the case of a multipara who had missed menstruation for several months there was an attack of pain in the abdomen with a slight, reddish discharge from the vagina. The physician in attendance, who sent the patient for consultation, stated that he had found a definite enlargement of the left side of the uterus which he thought a tubal pregnancy. On examination, the conditions were not typical of ectopic gestation, and it was thought that the patient had a double uterus with a single cervix. This was so much doubted that an abdominal incision was practised, when the enlargement of the right uterine body corresponding to $2\frac{1}{2}$ months' pregnancy was clearly demonstrated. The patient went to full term and was delivered of a healthy, living child.

A primipara in labor had an unusually long first stage. The child was small. After the birth of the child, the womb was still large and the outlines of another fetus could be felt. There was a thick, fleshy partition between the two halves of the uterine cavity. It was necessary to cut this with a long pair of scissors. The attempt to sever this septum was followed by a very severe hemorrhage which was arrested, but the patient developed septic infection and died on the fifth day. At autopsy, a fetus was found in the second uterine cavity, and a ragged wound in the septum between the two bodies.

A case illustrating the *tendency of this abnormal form of uterus to develop malposition in the fetus*. The writer had attended the patient in her third and fourth pregnancies, and in the first and second she was attended by different physicians. In both cases the child was in breech presentation, and both children were stillborn. In the third confinement the presentation was again a breech, and there was a curious thickening to be felt at the anterior aspect of the external os. Labor was somewhat delayed, but, when the breech was descending, the second uterus acted as an obstacle to the birth of the child and manual help became necessary.

In the fourth confinement, pregnancy had taken place in the same

anterior uterus and the posterior uterine body was drawn up above the level of the pelvic brim.

A case is also reported in which the mechanism of labor was interfered with because of abnormalities in development. The case illustrates the difficulties sometimes experienced in making a diagnosis between fibroid and pregnancy in a double uterus. The patient was first seen at $4\frac{1}{2}$ months and had slight uterine hemorrhage at irregular intervals. The uterus reached half-way to the umbilicus, was flabby and relaxed and there was an indefinite swelling on the left side of the uterine body. The cervix was deeply split bilaterally, the endometrium apparently thickened and boggy. The hemorrhages suggested placenta previa or an unusual condition of the endometrium.

The patient carried the child up to $7\frac{1}{2}$ months and then expelled a dead fetus. The placenta had to be removed by hand and then one could readily determine that the uterus was double, with a pregnancy in the right side.

A patient was admitted to the hospital for Cesarean section which had been done twice previously. The effort had been made to prevent conception by removing the Fallopian tubes. At the third operation the anterior wall of the uterus was found extremely thin in the site of a previous section. This was incised, the placenta readily displaced and the child delivered. The condition of the uterus was such that it was thought best to sterilize the patient. It was observed that the left tube and ovary appeared to be attached to the uterus while the right tube was absent. A small hard body the size of a goose's egg was on the right side of the recently pregnant uterus hidden in a fold of the peritoneum, extending from the posterior surface of the bladder to the rectum. This was the right half of a double uterus. Hysterectomy was done, removing the two horns, the mother making a good recovery.

A young primipara, aged 16, was found to have a very tender abdomen, with a lump on the right side extending a half-inch above the umbilicus. The lump could be moved from side to side but was fixed below. At operation, the great omentum was attached to the tumor which was very dark in color as though stained with blood. The left side was larger and the left tube greatly dilated. On puncturing the tube, a thick fluid, which was found to be sterile, poured out. Adhesions between the tube and bowel were separated, and a large clot removed from the peritoneal cavity. The left tube and ovary were removed and the abdomen closed.

The patient was then placed in the lithotomy position and a large swelling found on the left side of the vagina. This was incised and altered blood evacuated. The cavity was emptied by irrigation. It was found that the patient had two vaginae, the left imperforate, while the uterus had two horns. The patient made a good recovery from this operation.

She was later readmitted complaining of dysmenorrhea. She complained of pain in the lower abdomen which usually accompanied menstruation. Examination showed that the vagina was septate and that at the upper end of each vagina there was an external os.

On operation, each cervical canal was separately dilated. The

divided septum between the two vaginae was then excised and stitches inserted to prevent the oversewing of raw surfaces. The patient made an uninterrupted recovery.

An Attempt to Produce Abortion when Pregnancy was Absent. Stein¹ draws attention to a very dangerous class of cases where the woman believing herself pregnant, attempts to produce abortion although pregnancy may be absent, and also cases of attempted abortion in which the uterus is empty but in which there is an ectopic gestation. The high mortality rate, 43 per cent., seems to be caused by the determined effort with repeated interference to bring about abortion. He describes the case of a multipara, aged forty-three, near menopause, who thought a six weeks' interruption of menstruation was due to pregnancy and attempted to produce an abortion. She introduced an alum stick into the uterus and this was followed by a chill and fever. There was persistent vomiting and pain in the abdomen and a considerable amount of bloody discharge. Three days after this, the patient was in a serious condition, the abdomen tender, distended, the uterus slightly enlarged and extremely tender but there was nothing abnormal about the perimetrium and adnexa. A diagnosis was made of infected, incomplete abortion and under careful precautions the uterus was emptied. A small amount of tissue with fetid odor was removed. The night following the operation the temperature rose to 105.6°, and three days later the patient died of general septic peritonitis. A postmortem with microscopic study of the tissues showed no signs of an existing pregnancy.

The case is also quoted in which a woman, aged thirty-two, with one child eight years old, greatly feared pregnancy because her child had been born by the use of forceps on account of a contracted pelvis. When a very scanty menstruation occurred, the patient believed herself pregnant. She went to a doctor who made repeated intra-uterine injections followed by severe illness and left-sided perimetritis. A more complete examination showed that the pelvis was filled with thickened exudate. Under prolonged treatment, the patient made a partial and tedious recovery.

Cases are also cited in which women supposing themselves pregnant and attempting to produce abortion had pushed various instruments through the vagina into the pelvic or abdominal cavity. Cases are cited also of ectopic pregnancy interrupted by the efforts made to produce abortion. In many of these cases the effort to produce abortion ruptured the ectopic pregnancy, producing severe, and sometimes fatal, hemorrhage and in other cases infection was so caused.

While many of these patients become infected and were very ill, an extraordinary tolerance is sometimes shown to the introduction of foreign bodies.

In the observation of the reviewer, a woman attempting to produce abortion pushed a glass catheter full of dry urine deposit into the abdominal cavity. It was extracted by abdominal section. The patient had no fever nor infection. She did not abort but went to full term

¹ American Journal of Obstetrics, April, 1917.

and gave birth to a perfectly formed child. On examining the catheter, it was found in an exceedingly dirty condition and containing various varieties of bacteria.

Abortion. STREPTOCOCCUS INFECTION AS THE CAUSE OF SPONTANEOUS ABORTION. Curtis¹ has isolated the streptococcus as the direct cause of abortion in several cases which he reports. He isolated the streptococci from the urine of a mother whose child was born dead, from the placenta and also the heart's blood of the stillborn child. Intravenous inoculation of pregnant rabbits was made producing abortion or absorption of the fetus, while the streptococcus in pure culture could be isolated from the mother's uterus. It is thought that chronic streptococcus poisoning may account for cases of repeated abortion where no other cause can be detected.

THE BACILLUS OF ABORTION. Williams and Kohner² have studied cases of abortion from the stand-point of their bacteriology. They studied the sera of 50 women aborting in the early months of pregnancy, and found that the *Bacillus abortus* and the *Bacillus abortivo-equinus* yielded negative results, indicating that these microorganisms were not etiological factors.

The bacillus of epidemic abortion in cows has been isolated in milk. Hence it is advisable to subject aborting cows to rigid bacteriological and immunological tests for the bacilli before permitting the distribution and consumption of their milk. It has not been definitely proven that the *Bacillus abortus* is capable of producing abortion in women.

On the 50 patients examined, but 4, or 8 per cent., gave a positive reaction. In conducting the Wassermann reactions with the sera of aborting women, it is better to use cholesterinized extracts and antigens. Of the 50 women, the sera of 6, or 12 per cent., reacted positively in the gonococcic complement-fixation test. It is probable that a larger number were infected with gonococci, as this test is of limited delicacy.

PERFORATION OF THE UTERUS DURING ATTEMPTS TO INDUCE ABORTION. Beckman³ draws attention to the fact that it is difficult to recognize that a foreign body has penetrated through the uterine wall into the abdominal cavity. In 1 of his cases it was a laminaria tent and in the other a bougie. In the later case, a mistake in diagnosis had been made and pregnancy was absent and this, the writer states, is the forty-sixth case of the kind on record. As regards prognosis, it will depend in a large measure on whether the woman conceals what she has done, or confesses the effort which lead up to the penetration. The statement of the patient must be received with a great deal of skepticism, for, as a rule, she does not know what the operator has done. In some cases the foreign body may be palpated through the walls of the abdomen, rectum or vagina. If encysted, the body feels like a tumor. In the second case reported, there were no signs of peritonitis until the fourth or fifth day, and the writer advises that the uterus be left if there be no signs of infection. A case is reported in which the

¹ Journal of the American Medical Association, 1916, lxxvii, 1739.

² American Journal of Obstetrics, February, 1917.

³ Ann. de gynéc. et d'obst., 1916, xlii, No. 2.

operator removed a bougie from the abdominal cavity at the third month of pregnancy which progressed to term. In another case, the bougie was felt in Douglas' pouch 4 days after it had penetrated the wall of the 6 months pregnant uterus. Abortion followed twelve days later. On the sixteenth day the patient consented to abdominal section when the bougie was found between the umbilicus and the costal arch.

On one occasion the reviewer had under observation a multipara who had endeavored to introduce a glass female catheter into the bladder to cause abortion. The catheter disappeared, and the patient in fright came to the clinic for advice. On bimanual examination it could be felt in the lower abdomen and it was observed that the patient was several months pregnant. She was admitted to the hospital, and, on opening the abdomen, the catheter was seen lying among the coils of the intestine. It was removed, but no point of its entrance into the abdominal cavity could be found nor any injury to the contents of the abdomen. On examining the catheter, it was found to be almost filled with dried blood, mucus and urine crystals. Examination in the bacteriological laboratory showed many sorts of germs, including staphylococci and streptococci. The patient made an uninterrupted recovery and went to full term and was delivered spontaneously of a living child.

GANGRENE OF THE UTERUS FOLLOWING CRIMINAL ABORTION. Mauclaijer¹ describes, with illustrations, 4 cases of fatal gangrene with the autopsy findings. He also briefly mentions other cases, and, from the study of the histories and his own observations, concludes that the only chance of saving the patient in this condition is to operate, although conditions are most unfavorable, whether the gangrene is in the cervix or in the fundus.

The Placenta. THE RESULTS OF A ROUTINE STUDY OF THE PLACENTA. Slemmons² contributes a paper upon this subject giving the observations made in the obstetrical clinic of the University of California Hospital in the routine examination of 600 placenta.

He calls attention to the neglect of the study of the placenta in obstetrical clinics and states that this subject is of interest not only to the obstetrician but to the pediatrician as well. He will find in a diseased condition of the placenta, the cause for abnormalities in the infant.

In 41 instances the examination of the placenta with vision only revealed abnormalities. These gross anomalies were multiple pregnancy, 3; abnormal shape of the placenta, 3; two vessels in cord, 2; velamentous insertion of cord, 1; extensive infarction, 4; cysts of the placenta, 1; succenturiate placenta, 10; partial retention of the membranes, 17.

It is interesting to note that in the case of abnormalities of the vessels, in the umbilical cord there were deformities in the infant. Thus, in 2 cases there was but a single artery in the umbilical cord, and 1 of the infants having such a placenta had but one hypogastric artery; in the other case there was a perforated interventricular septum which did not essentially interfere with the life of the child. The child survived in

¹ Ann. de gynec. et d'obst., 1916, xlii, No. 2.

² American Journal of Obstetrics, August, 1916.

the case of velamentous insertion of the cord, and in 1 case there was rupture of an umbilical vessel and hemorrhage before birth. Examination of the placenta showed that this hemorrhage was fetal and it proved destructive to the child's life. In another case, as the head entered the pelvis, the placental circulation was blocked and this child also was stillborn.

The significance of succenturiate lobes lies in the fact that they frequently cause hemorrhage and are liable to become infected and are not infrequently retained within the uterus. It can scarcely be expected that the ordinary examination of the placenta, made at the bedside of the patient, could detect the retention of a small one of these lobes.

Portions of the membranes were missing in greater frequency at the beginning of these investigations, but, as the study went on, the clinical assistants became more careful in their conduct of the third stage of labor and the retention of portions of the membranes was less frequent.

The *study of stained microscopic sections* gave information of clinical value. The bloodvessels in the chorionic villi may give a clue to the time when the cord was tied. If this is not done until it has ceased to pulsate, the bloodvessels in the villi are comparatively empty. If, on the contrary, they are full of blood, one may reasonably assume that the cord was tied earlier than it should have been. It is also possible in this way to demonstrate the benefit to the child of late ligation of the cord.

There were 10 cases of maternal complications depending upon the placenta. Of these, there were 5 of premature separation; 1 of placenta previa; 3 of manual removal of the placenta; 1 of abdominal pregnancy at term.

In premature separation the question is how much of the placenta is rendered useless and what is the relation between the location and size of the separated area to the severity of the bleeding and what part of the placenta is most apt to become prematurely separated. These questions are all of direct clinical importance. Upon the fetus the effect of separation of the placenta is not the same as upon the mother, although often the life of the child is lost. In the 5 cases reported, but 1 terminated with the birth of a living child. The result for the fetus is usually determined by the degree of separation, but there may be other factors in the problem. Separation of the placenta is less serious for the fetus when it is limited to the circumference, but in one which penetrates to the center of the placenta, even though no greater area is involved, the results are much more serious.

Not only are abnormal cases better understood from the study of the placenta, but this also throws light on the normal development and attachment. In placenta previa the study of 1 case by thorough examination of the placenta may give information of clinical value in a succeeding pregnancy. A case is described of a multiparous woman giving a history of puerperal infection. The placenta was removed manually because of a serious hemorrhage in the third stage of labor. A firm attachment of the placenta was explained by fibrous adhesions between a portion of the after-birth and the uterus. Eighteen months later the patient entered the hospital for the birth of her fifth child and

at her wish Cesarean section with supravaginal hysterectomy was performed. A pathological condition of the placenta which had existed in a previous pregnancy was found again and justified the operative treatment.

Information of value concerning the physical condition of the fetus can also be obtained from an intimate study of the placenta. In premature delivery the placental findings are always significant, and the question of syphilis is at once aroused. In 17 premature deliveries, a diagnosis of syphilis was established in 6 and excluded in the remainder.

Premature infants were those weighing from 1000 to 2000 grams, with lengths from 30 to 40 cm. Among these there were 6 cases of syphilis; 4 of maternal toxemia; 1 of pyelitis; 1 of extensive infarction; and 3 undetermined. All of the syphilitics died, and the mortality among an equal number of premature infants born of mothers suffering from toxemia was 50 per cent.

There is often a tendency to consider every premature infant as syphilitic. This, however, is incorrect, as syphilis is the cause of death in only from one-fourth to one-third of premature children.

The diagnosis of syphilis cannot be fully made upon the gross appearance of the placenta. If the fetus has died some time before its birth, no matter from what cause, the placenta may be very firm, gray, anemic in color and the maternal surface may have a greasy appearance. It is commonly thought that the size of the placenta is of great importance. In cases where syphilis could be excluded and negative Wassermann reaction obtained, the ratio of child to placenta was not infrequently 1 to 5; 1 to 4 and occasionally 1 to 3. Its relationship seems somewhat more reliable when applied to premature infants. In making this study it is important to remember that before term, the placenta usually weighs more than $\frac{1}{6}$ the weight of the fetus. To obtain trustworthy evidences of syphilis, the chorionic villi must be studied. If they are freshly teased in normal salt solution or water and examined microscopically they are enlarged, opaque and irregular in shape, with swollen ends if syphilis is present. The bloodvessels also are not apparent in many of the villi. When these conditions are found, they should be verified by the examination of properly fixed, hardened and stained sections before the diagnosis of syphilis is positively made. These stained section show huge, dense villi, but they afford a better opportunity than the fresh villi for studying the conditions of the bloodvessels. In them the pathological process seems to begin in an endarteritis which often plugs the vessel. The enlargement of the villi is produced by the proliferation of the stroma. The spirochetæ are so rarely found that, clinically, the search for them has scarcely been useful.

Among 600 placenta, a positive diagnosis of syphilis could be made in 14. While at first a Wassermann test was not made, later on it was carried out in every patient in the obstetrical ward. The results are tabulated in four groups.

In the first group the Wassermann was negative, and the placental findings were negative. This group embraced 242 cases. In the second group the Wassermann reaction was positive, and the placenta positive

in 7 cases. In the third, the Wassermann was negative, and the placenta positive in 1 case. In the fourth, the Wassermann was positive, and the placenta was negative in 10 cases. In group III a patient, aged twenty-seven years, had four consecutive abortions. The pregnancy under consideration ended spontaneously at the eighth lunar month. The fetus was 40 cm. long and weighed 1960 grams; the placenta weighed 480 grams, and the chorionic villi were definitely syphilitic. At autopsy upon the fetus, the organic lesions characteristic of congenital syphilis were present. Here all of the evidence except a positive Wassermann reaction pointed to syphilis. A diagnosis of syphilis may be made when the Wassermann reaction is negative.

In the group in which the Wassermann was positive and the placenta negative, a strongly positive Wassermann reaction was obtained in only 2 patients; 1 of these was suffering from a streptococcus infection which was probably responsible for the reaction. The Wassermann test alone indicated syphilis, although no history could be obtained and the chorionic villi were normal. On the fetal surface of the placenta there was an inflammatory infiltration, and streptococci were found in the subamniotic connective tissue. This germ was also present in microscopic sections of the cord, and was isolated from the uterine cavity on the third day. The child died of hemophilia, and, at autopsy, one could not demonstrate the lesions of congenital syphilis. It may be inferred that the positive Wassermann reaction in this case could not be attributed to syphilis. A similar result has been seen in scarlet fever.

In a second case in which the Wassermann reaction was strongly positive and the placental findings negative, the patient was almost certainly syphilitic. The mother gave a history of specific infection eight months previously and had not been treated. The maceration of the fetus made it impossible to identify the lesions of congenital syphilis, and stains for the spirochetæ were not made. When the chorionic villi were teased and examined, the appearances were suspicious of syphilis, although the stained sections were negative. It must also be remembered that normal areas may occur in syphilitic placenta.

In the remaining 8 cases of this group, the Wassermann reaction was faintly positive and everyone of these patients was suffering from the toxemia of pregnancy with albuminuria. Unfortunately, a second Wassermann was not made, but this should be done before one can definitely assert that the toxemia of pregnancy may explain a faintly positive Wassermann reaction. In none of the 8 cases could a history of syphilis be obtained. The placenta were normal, the infants healthy and in good condition when discharged from the hospital. When visited, four weeks later, none of the signs of congenital syphilis were present. In estimating the value of the Wassermann reaction in pregnancy, it must always be remembered that toxemia may give a positive reaction when there can be no doubt of the absence of syphilis. Among the 260 cases on whom serological tests were made, there were 22 suffering from albuminuria, and among these there were 14 negative Wassermann reactions, giving approximately in every third case a positive reaction. It may be argued that syphilis may underlie these toxemias.

Whether this is true is a question, but it seems more probable that some disturbance in the patient's metabolism produced the faintly positive reaction.

In attempting to summarize the conclusions reached from the study of 260 cases, one must first remember that the chief source of confusion in the interpretation of the Wassermann test during pregnancy lies in the presence of an auto-intoxication with albuminuria. The toxemia causes slight degrees of fixation due to some condition independent of syphilis. By classifying these cases of toxemia as negative for syphilis, and taking into account the cases in which the Wassermann test and the placenta were both in agreement, the same result has been obtained in 257 cases, or nearly 99 per cent. of the whole.

In 3 cases the results were contradictory; one suffering from streptococcic puerperal infection gave a positive Wassermann reaction. In the other 2 cases puerperal infection was certainly absent, and yet the Wassermann test and the examination of the placenta were contradictory. It is evident that both examinations are required to make sure a diagnosis.

In establishing a diagnosis of syphilis, the microscopic examination of the umbilical cord has no great practical value. Very rarely are the spirochetæ to be demonstrated there. Inflammation of the umbilical vessels with exudate, which has been regarded as specific for syphilis, may be independent of the disease. In 400 obstetrical cases, in 40 the presence of syphilis was positively ascertained and in only one-half of these were there inflammatory changes in the umbilical cord. In 32 in whom syphilis could be excluded, oömphalitis was present.

Placental bacteremia usually occurs in cases where the membranes rupture prematurely and the frequency of this complication is greatly increased by abnormal presentation, contracted pelvis, and in elderly primiparæ, and is therefore seen more often in hospitals than in private practice.

The lesion consists of an acute exudative inflammation beginning upon the fetal surface of the placenta and as the fetal vessels cross this region they become readily involved. Bacteria can be demonstrated in the subamniotic connective tissue and at times also in the walls of the fetal bloodvessels. Usually, because there may not be sufficient time, the infection does not spread to the decidua and the villi are rarely involved. The bacteria evidently enter the placenta from the amniotic cavity and infection of the amniotic liquid occurs because the membranes have ruptured prematurely and vaginal examination leads to the contamination of the amniotic cavity. When the amniotic epithelium are examined microscopically, they seem to lose their cuboidal form and become tall and narrow in cases where the membranes rupture prematurely. The basal detachment of the cells is restricted, the nuclei are dislocated upward and at times actually forced through the cell membrane. This seems to be the expression of mechanical force exerted in the retraction of the uterus. Microscopic examination shows that the function of these cells is greatly impaired or terminated, and they are desquamated for longer or shorter stretches leaving the amniotic con-

nective tissue uncovered. It is thought that through the apertures left by the desquamation of the cells, bacteria gain entrance to the placenta.

When the deaths of the fetus and early infants are observed, it is found that syphilis was responsible for 7; birth injuries, 6; premature separation of the after-birth, 4; placental bacteremia, 4; congenital heart lesions, 3; toxemia of pregnancy, 2; enlarged thymus, 1; pneumonia, 1; abdominal pregnancy, 1; undetermined, 4. Not infrequently infection of the fetus leads to its death shortly before or within a few hours after its birth.

On summing up the results of this study in 600 cases, there were gross anomalies of the placenta in 41; maternal complications in 10; death of the infant in 33; premature children born, 17; the question of syphilis was raised in 18; placental bacteremia was diagnosed in 4. In 1, of 5 or 6 specimens presented, there was some abnormality. When the placenta is normal, the pediatrician is interested in the fact, for this information makes it more certain that the infant began life in a healthy condition.

In well-organized clinics the placenta should be carefully studied at the bedside and also in the laboratory. While the practitioner cannot carry out laboratory and detailed research, if he does not wish to overlook important data, the placenta should be subjected to microscopic study. It should be weighed and measured, gross abnormalities noted, fresh tissue teased and chorionic villi studied microscopically. These data should be recorded, and thus become more reliable, and complications developing during the puerperal period may sometimes be more clearly understood by reference to the study of the placenta.

When teased villi suggest syphilis, the placenta should be sent to a pathological laboratory and stained sections prepared. Simultaneously, a Wassermann test upon the mother's blood should also be made. The same procedure should be carried out if delivery occurs prematurely. While at times the diagnosis of syphilis will result, more often these investigations will remove the suspicion of the disease. If an infant is stillborn or dies within the first few days of its life, the study of the placenta should be comparable in painstaking care to that given fetal organs at autopsy.

THE VILLOSITY OF THE PLACENTA. Kervily,¹ published a minute study of this subject from the Tarnier Clinic.

In their researches they have actually seen all of the cells studied which form the substance appearing under the aspect represented in their illustrations and especially have they been able to identify the particles of secretion and of fat progressing into chondrio formations in their protoplasm. In the polarized cells the orientation of the chondriomes and the chondriomits causes a movement essential to secretion. The grains of secretion whose formation is the end of the process of elaboration appear to be more and more numerous and larger in production as they approach the pole of the cell, where they will cause elimination of the substance constituting grains of secretory matter.

¹ Arch. mens. d'obst. et gynec., June 30, 1916.

As the cell eliminates its products of secretion more often upon its face, one does not find a regular orientation in the mitochondrial formations. The passage of these grains of secretion does not take place with this material in the exact shape of grains. They seem to dissolve in the protoplasm and traverse the walls of the cells by dialysis. In certain cells one finds chondriomes, chondriomits and mitochondromes. In other species charged with as yet no function, one does not find the group of mitochondrial formations represented as complete.

PLACENTAL SEPARATION TREATED BY CESAREAN SECTION. Mayne,¹ reports the case of a woman, seven months pregnant, who had begun to bleed at noon on the day when she was first seen. Her physician tamponed the vagina, but bleeding commenced again and the tampon was removed and replaced. This last packing controlled the hemorrhage for but two hours. It again commenced and the patient was sent to the hospital. On admission, she had a severe hemorrhage and seemed considerably depleted. On examination, the os was very small, through which it was impossible to introduce one finger. Section was immediately performed and a child weighing $3\frac{1}{2}$ pounds delivered. The placenta was almost entirely detached and there was fully a quart of blood and clots in the uterine cavity. The patient made a good recovery, leaving the hospital on the fourteenth day. This woman had borne 3 children at full term. Whether the vaginal packing had any influence upon the continuance of the hemorrhage could not be readily ascertained.

PLACENTAL SEPARATION CAUSING ASPHYXIA IN THE INFANT. Welz,² reports the case of a primipara at labor in the hospital, who had a normal pregnancy except for a slight trace of albumin and vaginal hemorrhage. Pains began at fifteen-minute intervals, and hemorrhage increased. Clots were expelled with uterine contractions. The patient was pale and prostrated. No fetal heart sounds could be heard, and the patient said she had felt no movement for some hours. The uterus was oval, boggy and the size of a nine months' pregnancy. The fetus lay in the right occipito-anterior position, with the head unengaged. The external pelvic measurements were normal.

On vaginal examination the pelvis was normal, the vagina filled with clotted blood, the cervix thinned out, the external os 4 cm. in dilation, the membranes intact and no placental tissue could be felt.

Dilatation was manually completed under ether anesthesia, the membranes were ruptured and bipolar podalic version performed, the right hand bringing down the left leg. A premature fetus weighing 2100 grams, 47 cm. long, was easily extracted. The child was in the condition of asphyxia pallida from which it was resuscitated in about 20 minutes with the aid of a lung motor. On account of the hemorrhage and the anemic condition of the patient, an endeavor was made to immediately express the placenta. This was done with considerable difficulty. The after-birth consisted of four distinct placentæ and membranes which were traversed by numerous bloodvessels. The cord was attached to the center of the largest placenta, which was almost circular, 10 cm. in

¹ American Journal of Obstetrics, July, 1916.

² Ibid., November, 1916.

diameter and 1 cm. thick. About 5 cm. away at the same level was the second largest placenta, rather oval in shape. The uterine surfaces of these were soft and normal. A very rich vascular supply ran through the membranes. Histologically, the placenta were normal.

The two larger were evidently attached to the side of the uterus below the fundus. The smaller ones were attached to the lower uterine segment but were not placenta previa. The uterine contractions loosened the two lower ones as the lower uterine segment was dilated. The detachment of these produced severe hemorrhage from their sites of attachment to the uterus. After this detachment, the two larger placenta, which continued in attachment, permitted sufficient aeration of fetal blood for several hours. This attachment, however, was insufficient for the oxygenation of the fetal blood and asphyxia pallida was the result. The fetus had not breathed in the uterus as there was no fluid or mucus in the air passages. After proper aeration of its blood, the fetus recovered, its color returned, and it became normal.

TRUE PLACENTA PREVIA. Hellier¹ discusses the place of Cesarean section in dealing with placenta previa. He believed that modern opinion was strongly in favor of terminating pregnancy without delay when there had been one well-marked hemorrhage. With a patient not in labor, in whom the genital canal was uninfected, Cesarean section by a physician competent to do abdominal surgery might be strongly recommended. He quotes 3 cases in favor of this opinion. In 1, a patient had a severe hemorrhage and was treated expectantly, and a second hemorrhage proved fatal before she could be delivered by version. In 2 other cases, after the first hemorrhage he had performed Cesarean section and had saved both the mothers and the children. He believed that such cases should be transferred to a nursing home or hospital after the first hemorrhage and treated by hysterotomy. This does not imply that all cases of placenta previa should be treated by Cesarean section; many should still be managed by version. After version had been performed, however, he did not believe that the obstetrician should delay until the uterus expelled the child by its own efforts.

PLACENTA PREVIA TREATED BY PITUITARY EXTRACT. Gallagher² reports 4 cases of placenta previa treated by pituitary extract.

The first was a multipara at term, bleeding freely from a marginal placenta previa with very little dilatation. The position of the child could not be made out, but the head was low down. One-half c.c. of pituitary extract was given and caused the pain to increase and the bleeding to grow less. In an hour dilatation and bleeding were increased, and $\frac{1}{2}$ c.c. of the extract was again given. At 12.30 A.M., bleeding had become less. At 1 A.M., dilatation and bleeding were again increased and the membranes were ruptured. One c.c. of pituitary extract was again given and the patient delivered. The child was in the left occipito-anterior position and presentation. The placenta was delivered in two parts, the first about the size of the palm, and the second the cord, membranes and other débris. Both mother and child survived and did well.

¹ British Medical Journal, November 11, 1916.

² Surgery, Gynecology and Obstetrics, April, 1916.

Case II was a multipara who began to have severe hemorrhage when labor pains became pronounced. There was a marginal placenta previa on the right side and fetal heart sounds were indistinct. Pituitary extract was given in two doses and when the pains were vigorous, the membranes were ruptured and the pituitary extract repeated. The child was expelled spontaneously and both did well.

A third case was that of marginal placenta previa in which several doses of pituitary extract were given, followed by the spontaneous delivery of a small child.

In the fourth case no fetal heart sounds could be heard, but there was free hemorrhage and the patient was delivered of a stillborn child. Partial placenta previa was here present.

The writer believes that in dealing with placenta previa everything should be in readiness to perform version or to use a dilating bag, if necessary. During the first stage, small doses of pituitary extract, $\frac{1}{2}$ c.c., may be used as needed, and when dilatation is complete, from 1 to $\frac{1}{2}$ c.c. should be given. So long as progress is being made, interference should be avoided. If the loss of blood is extreme, an intravenous transfusion of saline is indicated. There is especial necessity for aseptic and anti-septic precautions.

There is no drug in use in obstetric practice at the present time so dangerous as pituitrin. It causes prompt and vigorous uterine contraction which speedily subsides and which is violent enough to promptly tear resisting tissue. The cases described by the writer as treated by pituitrin are those of marginal or partial placenta previa. In such cases the essential element is rupture of the membranes and the free discharge of amniotic liquid. If labor pains be then stimulated by hypodermic injections of strychnine of moderate dosage, a tonic, and not a clonic contraction of the uterus results, the presenting part is pressed against the placenta and spontaneous expulsion occurs without danger of rupture. In placenta previa the lower uterine segment and cervix are especially soft and tear readily, and hence it is best to avoid so powerful a drug as pituitrin.

The *treatment of placenta previa*, at present followed by the most experienced obstetricians, is usually as follows:

Cases may be divided into those in which the membranes cannot be reached and those in which a considerable portion of membrane is available through the vagina. Again, they may be divided into those which can and will go to hospital, and those which cannot be removed from their homes. It would be far better if all cases of placenta previa could be delivered in hospital, but this, unfortunately, may not be possible.

In cases in which the placenta entirely covers the os and the patient must remain in her dwelling, the obstetrician may choose between Braxton Hick's method, namely, tearing through the placenta, catching a foot of the child and pulling the breech through the placenta into the pelvis, or the use of the dilating bag, either passed through the placenta or placed against it and then dilated. Each of these methods has its advocates, and each gives a fair percentage of maternal recovery. Probably the use of the bag may give a slightly better result for the

child. Each exposes the mother to the danger of laceration of the uterus, postpartum hemorrhage, and infection. Each exposes the child to the danger of long-continued bleeding and birth pressure.

In cases that can have the advantage of hospital care, when the internal os is entirely covered by placenta, immediate abdominal section gives the best chances for mother and child. This should be followed by firmly tamponing the uterus with iodoform gauze, while intravenous saline transfusion may be practised while the operation is in progress. Should the patient be already infected, with sepsis, the operator may conclude the operation by the removal of the uterus or by a hysterectomy, leaving the stump outside the peritoneal cavity in the lower end of the abdominal incision.

In cases in which considerable space of membrane is available, this should be ruptured as soon as possible, and as extensively as can be done, and as much amniotic liquid as possible should be allowed to escape. The patient should then be given moderately tonic doses of strychnine hypodermically and labor allowed to go on until spontaneous expulsion results. If conditions are favorable, and the heart sounds of the child show the result of the hemorrhage and pressure, delivery may be expedited by the use of forceps.

We have come to recognize that in placenta previa one of the greatest dangers to which the patient is exposed is that of *septic infection*, and that, for this, the tampon is largely responsible. This was illustrated in a recent experience of the reviewer.

A multipara, during a previous pregnancy, had intermittent hemorrhage for several days, which finally ceased as labor developed and a dead child was born.

In the next pregnancy, hemorrhage occurred, but, as the woman had recovered from this condition formerly, little attention was paid to it. Finally, a physician was summoned who applied a tampon of iodoform gauze in the vagina, and, as hemorrhage continued, the patient was sent to the hospital.

On admission, she was blanched, with rapid, feeble pulse, vagina partly filled with blood clots and containing the tampon. There had been repeated examinations by a midwife and a physician. The patient was considered as infected. A rapid delivery by abdominal section was practised, the uterus emptied and the stump left outside the peritoneal cavity, and a living child was born, which survived. On removing the tampon from the vagina, a large quantity of clotted blood was found upon the tampon in the vagina and cervix. The patient developed septic infection and passed through a critical illness, dying from sepsis 49 days after delivery. The absolute inefficiency of the tampon was plainly demonstrated by the quantity of blood which was retained by it.

In dealing with placenta previa, one must also remember that attempts at repeated and forcible dilatation of the cervix must result in severe *laceration* and *hemorrhage*. On one occasion the reviewer was called to a case of placenta previa in which a physician had attempted to dilate the cervix by the use of Bossi's dilator to practice version and extraction. This had been accomplished, but, on the delivery of the child, the patient collapsed, with severe hemorrhage.

On examination, there were severe lacerations of the cervix, two extending up to the anterior portion and opened into the peritoneal cavity near the base of the bladder. The patient rapidly succumbed to shock.

In placenta previa there is a marked tendency to *postpartum hemorrhage*, and this can only be controlled by packing, because the expulsive segment of the uterus may be firmly contracted without controlling the bleeding. Hemorrhage in these cases comes from vessels in the lower segment, and, as this has little, if any, contractile power, drugs which cause the upper segment to contract will not control bleeding from this source, hence cases of placenta previa require very firm packing from the fundus down into the vagina.

Patients suffering from placenta previa are also liable to *thrombosis* and *embolism*. The loss of blood is usually from traumatism, and the manipulations practised all favor the development of this complication.

Especial care must be taken to practice strict *antisepsis* and *asepsis* when dealing with placenta previa. Infection is more dangerous than hemorrhage in these cases and the condition of the patient predisposes to the development of pyemia.

In stimulating these patients before and after delivery, strychnine, $\frac{1}{15}$ to $\frac{1}{10}$ grain in all, is especially useful combined with atrophine and digitalis. Intravenous saline transfusion of from 20 to 30 ounces is also valuable. The head of the patient's bed should be very much lowered, and beneath the cerebellum should be placed a hot-water bottle. Stimulating enemata of hot coffee, whisky and salt solution are useful. So soon as the patient begins to be restless, a hypodermic of morphine and atropine must be administered and repeated if necessary. Artificial heat should surround the patient, and an abundance of fresh air should be available.

The *fate of the child in placenta previa* will depend upon the quantity of blood lost by the mother and the method of delivery. For the child, delivery by abdominal section is safest, and version and extraction most dangerous. In the interest of the mother after version, extraction should never be performed. A rapid delivery of the child by traction on the legs will severely tear the cervix and lower segment, and serious hemorrhage may result, hence it is well to disregard the life of the child, and, after version has been done and the breech brought down to serve as a tampon, no further steps should be made to deliver. The attention of the obstetrician should then be turned to stimulating the mother, and the advent of labor pains should be awaited. When these have developed, such assistance as is necessary may be given, but rapid and vigorous extraction should never be practised.

Cases of placenta previa should not be treated by vaginal Cesarean section because the lower segment and cervix are unusually vascular in these patients, and unusual hemorrhage will be experienced.

LABOR.

Analgesia and Anesthesia in Obstetric Practice. Skeel¹ utters a protest against the extravagant claims made in favor of the administra-

¹ Journal of the American Medical Association, March 11, 1916.

tion of NITROUS OXIDE AND OXYGEN GAS in cases of labor. He does not believe that anyone may use these with perfect safety, and he is sure that in the hands of an incompetent and careless person, great harm may result. He contrasts the effect of nitrous oxide and oxygen with that of morphine and ether.

He believes that in normal cases, when the os is rigid and very sensitive during the first stage of labor, when pains are nagging and uneffectual and labor does not proceed promptly, morphine hypodermically is the best remedy. At the beginning of the second stage, following its use, a larger proportion of oxygen and nitrous oxide can be employed than usual. At the moment of expulsion, as much as 70 to 80 gallons of nitrous oxide are given practically continuously. When the head is upon the perineum, the nitrous oxide is at once stopped and the patient is revived by giving pure ether.

In primiparae, with rigid and inelastic perineum when laceration seems inevitable, ether is substituted for gas and the patient pushed to complete unconsciousness as the head passes over the perineum. To carry this out properly, the services of a skilled anesthetist, as well as those of the obstetrician, are required. Under gas, injuries of the perineum and pelvic floor can be repaired, but, if the cervix requires attention, it is well to substitute ether.

In abnormal cases, while allowing labor to develop as a test, gas may be used. If the head can engage and descend, it is used freely during the second stage, and, if necessary, pituitary extract is given in doses of one-half ampule. The results of this treatment have been, in many cases, satisfactory, and labor has proceeded without interruption. In cases in which infection is suspected, this method of treatment has secured the spontaneous expulsion of a living child and spared the patient the risk of section.

For the use of forceps, gas analgesia is increased to complete anesthesia, and, when the head is brought upon the perineum, ether is substituted. Gas cannot be relied upon for version as it does not sufficiently relax the uterus. For abdominal section, ether is better because of the greater ease of manipulation unless the patient is severely toxic when gas may be used, and ether in quantities as small as will produce an effect.

Danforth¹ writes concerning nitrous oxide-oxygen anesthesia in labor, giving the results of his experience in the Obstetrical Department of the Evanston Hospital. His clinical material embraced 133 cases, of whom 33 received this treatment for 2 hours or more. The longest time of its administration was 7 hours to one patient. Seven took it for 3 hours; one for 5; one for 6, and one for 7.

Careful records have been kept, and the results, on the whole, have been good. No harmful effect on the fetal heart has been observed, nor has there been asphyxia. Hemorrhage occurred in 1 case.

Experiments have been conducted with various methods of administering gas. In some cases nitrous oxide alone was given for the first

¹ Surgery, Gynecology and Obstetrics, March, 1916.

two or three breaths and then from 5 to 10 per cent. of oxygen was added. In a considerably larger proportion of cases gas alone was used, oxygen being added if there was a trace of cyanosis. These cases seem to have done remarkably well. After the stage of analgesia is reached, the remainder of the pain can usually be borne without the administration of gas and without suffering. Gas is given more freely as the head passes over the perineum.

Care must be taken that the patient does not pass too deeply under the gas, when labor pains may be retarded. Slight cyanosis even is to be avoided, as it is not necessary.

Delivery by low forceps can be done under gas, but, for more prolonged operations, ether is better.

It is thought that one of the great advantages of gas is the fact that it can be given for so long a time but many multiparae who had rapid and easy labors have experienced benefit from its use. The majority of patients stated that they were conscious of uterine contractions but did not feel pain during the second stage.

So far as their experience has gone, elements of danger have not developed. Machines for giving gas should be so regulated that the rapidity of the flow of gas from the cylinders to the mask is entirely under control.

Reed¹ contributes a paper entitled "Contribution to the Study of Twilight Sleep." His material was 100 consecutive cases and the preparation of SCOPOLAMINE used was a domestic product. In no case was morphine given but once and scopolamine was repeated only as the symptoms seemed to require. The patients' rooms were kept as still as possible, but considerable noise occurred at various times. Relatives were kept away during labor. So far as dosage is concerned, morphine sulphate, $\frac{1}{8}$ to $\frac{1}{6}$ grain, and scopolamine hydrobromide, $\frac{1}{300}$ to $\frac{1}{150}$ grain, were injected under the skin when contractions were 5 minutes apart or less. At an interval varying from 15 minutes to 4 hours, scopolamine was repeated in doses of $\frac{1}{150}$, $\frac{1}{200}$ or $\frac{1}{300}$ of a grain. Scopolamine was given twice in 59 cases; 3 times in 12; 4 times in 4; 5 times in 1. In 22 cases only did a single initial dose of morphine and scopolamine seem to suffice. As regards the results, 14 of the patients felt a few pains; in 215, pain was greatly diminished; in 56 there was no pain whatever; in 2 cases there was no relief. Three women claimed after delivery that they felt every pain just as usual, although they showed mental confusion and physical signs of drug saturation. Four patients threw themselves violently about on the bed and showed great mental excitement, but afterward reported no pain. In 6 cases the injections were abandoned, because uterine contractions became weak and threatened the cessation of labor.

There were 2 maternal deaths in the series, 1 from placenta previa complicating myocarditis, and the other from hemophilia. Eight babies died; 3 were macerated, in the absence of heart sounds and the presence of other symptoms. In 1 case the cord prolapsed; 1 child was born

¹ Surgery, Gynecology and Obstetrics, June, 1916.

asphyxiated, resuscitated with difficulty and died a few hours later; 1 child was premature; 2 were delivered by forceps. In no case could one ascribe the death of the fetus to the injections. There were 4 cases of violent mental and muscular excitement, none of whom developed insanity. The third stage of labor was not affected, so far as could be seen. Lactation was not interfered with because the mother's energy was conserved. Labor is undoubtedly prolonged and the tendency to fetal asphyxia is considerably increased.

To carry out this treatment successfully, the patient must be kept under constant observation, and only a skilled and experienced person can assume charge of such a case. The writer believes that the treatment is successful, as 29 per cent. of the cases were practically free from pain, and 56 per cent. entirely free from pain, or 85 per cent. in all. They observed that the woman's strength was well maintained, and they had none of the dangerous results sometimes quoted.

THE APPLICATION OF ANOCI-ASSOCIATION TO OBSTETRICS. Hoag¹ treated 30 cases of labor by perineal injections. Twenty were given nitrous oxide only. The perineum was, in all cases, injected with 0.25 per cent. novocaine varying in amount from 160 to 200 c.c. Eleven received, in addition, 30 to 40 c.c. of 1 per cent. quinine-urea solution. The maximum amount of the two solutions injected in any case was 175 c.c. The injections were made as the head appeared. The vulval edges were turned back and a long needle inserted at the junction of the skin and mucous membrane, the fingers of one hand being in the vagina to note its position. Novocaine was injected first, and the quinine-urea immediately afterward.

Among these was a group of 20 cases which received nitrous oxide-oxygen only, of whom 17 had from one to five doses of scopolamine during the first stage before nitrous oxide and oxygen was begun. The initial dose of scopolamine was $\frac{1}{200}$ grain, combined with morphine $\frac{1}{6}$ grain, or narcophin $\frac{1}{2}$ grain. This was followed, usually at irregular intervals, by the same dose of scopolamine without the morphine or narcotin. In 4 of the prolonged labors, a second smaller dose of either morphine or narcophin was given. Excessive amounts of scopolamine often proved worse than none because the patient must be mentally clear to give proper coöperation with gas analgesia. In none of these cases was the amount sufficient to seriously disturb the mental condition. Nitrous oxide and oxygen analgesia was begun before the end of the first, or at the beginning of the second stage.

There was marked difference between private and clinic cases in regard to the treatment, so far as the avoidance of pain was concerned. Private patients attended by professional anesthetists suffered very little. Some of them had absolutely no pain. Others asked for more anesthetic and complained of distress, but could not remember having had much pain. Among clinic cases, conditions were less favorable. Many of the patients could not speak English, and could not understand what was being done for them. In some cases, gas was given by men not skilled in its use.

¹ Surgery, Gynecology and Obstetrics, November, 1916.

During the delivery of the head, analgesia was succeeded by complete anesthesia in all cases. This is thought to be important, as it lessens the danger from the sudden expulsive contractions which so often produce tears.

In the first 20 cases, delivery under nitrous oxide and oxygen and anoci alone, 19 were primiparae and 1 was a multipara. There was 1 case of brow presentation, which was delivered by low forceps in which nitrous oxide and oxygen worked well.

So far as the length of labor is concerned, the statistics seem to show that nitrous oxide and oxygen anesthesia had shortened the second stage.

The forceps was used three times. The results in these cases do not indicate that the forceps was used more frequently than without this treatment.

As regards *lacerations*, they were present in 10 cases. In the 20 cases, there were three second-degree lacerations, each of which was unavoidable. In the 30 cases the perinea were carefully watched for complications attendant upon the injection of the novocaine and quinine-urea, but none were observed. In a few cases there was some edema and tenderness on the second or third day, but apparently no more than in other cases in which it was not used. The perinea, which had to be repaired, healed promptly.

There seemed to be no doubt but that the injections of novocaine improved the relaxation of the perineum, and while the perineum is a large field to be thoroughly injected, the pressure of the head against the muscles aided the treatment. The quinine-urea in the quantities used apparently had little result in relieving the soreness after delivery, but it may have aided in keeping up local anesthesia.

In the 30 cases, 28 of the children were born in excellent condition, breathing spontaneously. One was stillborn at 8 months, no fetal heart sounds having been heard for several days. In the other, the child was delivered with forceps, the cord tightly coiled about the neck. Nitrous oxide and oxygen had been given for 15 minutes only, followed by ether for 1 hour.

PERINEAL ANESTHESIA IN LABOR. King¹ reviews the anatomy of the perineum and states his method in nearly 100 cases.

A 2 per cent. solution of novocaine in normal saline solution was sterilized and allowed to cool, and to this was added $\frac{1}{3}$ m. of $\frac{1}{1000}$ solution of adrenalin chloride to each c.c. To obtain the land-marks, the pubic arch was palpated and the site of the injection was cleansed with alcohol or benzine, followed by tincture of iodine. Each site was sprayed lightly with ethyl chloride. In the anterior triangle the needle was entered 2 to 4 cm. above the lower margin of the vagina and 2 cm. from the rami. The needle passed 2 to 4 cm. in depth, and the expression of sudden pain as the needle meets the positive resistance of Colles' fascia indicates the proper depth, pass the needle through the fascia and inject the solution, using $1\frac{1}{2}$ c.c. of a 2 per cent. solution for each injection. In the posterior triangle of the perineum, incline the

¹ Surgery, Gynecology and Obstetrics, November, 1916.

needle laterally and enter it midway between the anus and the tuberosities to the depth of 4 cm. In the posterior triangle use from 5 to 10 c.c. of a 1 per cent. solution for each injection. Injections are made bilaterally, primiparae require one anterior while multiparae may require both anterior and posterior injections.

There were no bad results following the 100 injections. A slight superficial necrosis of the inner lips of the labium followed the injection of adrenalin, but this cleared up without difficulty. Anesthesia began in a few minutes, and was prolonged 2 to 4 hours. Lacerations were diminished in number and extent. Hemorrhage from laceration was greatly diminished due to the adrenalin and the lessened extent of the tears. Repair was facilitated because of the duration of the anesthesia. Alcohol or benzine sterilization of the obstetric area can be readily and painlessly carried out under this procedure. The posterior triangle of the interior is infiltrated and the general practitioner can safely and easily use this method of treatment.

This is a revival of the experiment made when cocaine was first introduced by injecting it into the perineum to lessen the pain of labor. The method was not found satisfactory, and was subsequently abandoned for anesthesia by ether or chloroform. There is no doubt but that the additional danger of septic infection must arise from such injections.

MORPHINE AND HYOSCINE METHOD OF PAINLESS CHILDBIRTH. Haultain and Swift,¹ at the Royal Maternity Hospital of Edinburgh, have employed this method, which consists in putting the patient in a quiet, darkened room as soon as pains begin and plugging the ears with cotton-wool. When pains occur regularly and the os admits two fingers, a hypodermic injection of morphine hydrochloride, $\frac{1}{4}$ grain, with hyoscine hydrobromide, $\frac{1}{150}$ grain, is given. This makes the patient drowsy, and she frequently sleeps until awakened by stronger pains. The second injection of hyoscine, $\frac{1}{450}$ grain, is usually given at the end of an hour. Half an hour later the patient's memory is tested and she is allowed to sleep. When awakened, her memory is again tested and if she remembers an object seen previously, another dose of hyoscine, $\frac{1}{450}$ grain, is injected. If she does not recognize the object, the depth of desired unconsciousness has been reached. This memory test is repeated later, and, if necessary, a similar dose of hyoscine may be given. The patient usually sleeps between pains but is conscious during them, although she does not appreciate the pains as such and could not describe them.

The child is usually born normally, and, after the delivery of the placenta, the patient sleeps quietly from 4 to 6 hours and awakens feeling much better. During labor, she is catheterized, which is a point of considerable importance. Patients are often thirsty, and a plentiful supply of water should be afforded.

There were 40 cases taken consecutively, 36 primiparae and 4 multiparae. The first dose was morphine, $\frac{1}{4}$ grain, and hyoscine, $\frac{1}{150}$ grain. In 3 cases morphine, $\frac{1}{6}$ grain, was given and hyoscine, $\frac{1}{150}$ grain, and apparently the smaller dose in some cases would do as well, but, in the

¹ British Medical Journal, October 14, 1916.

average case, the larger dose is to be preferred. In 1 patient the hyoscine, $\frac{1}{150}$ grain, was given alone to see whether it would control pain. It was repeated twice, in doses of $\frac{1}{450}$ grain, without effect. In order to secure freedom from pain, it was necessary to give morphine, $\frac{1}{4}$ grain. In 3 cases morphine was repeated; in 1, because the labor was so long; the second was one of long labor threatened with exhaustion, and the third one in which the pains stopped. In these cases the child breathed slowly, but was resuscitated. The smallest number of injections given in any cases was 4, and the greatest number was 45. The average number of hyoscine injections was 11.

In 30 out of 40 cases, namely 75 per cent., total amnesia and analgesia were obtained. The other cases varied from slight amnesia 13 per cent., to no amnesia, 12 per cent. In every case there was at least slight analgesia. In 1 case there was marked restlessness following the injections, so that they had to be stopped, and in 1 there was postpartum hemorrhage. Among the 40 cases, there were 14 forceps deliveries, or 45 per cent. It is stated that the rule of the clinic is to apply forceps in the second stage after labor has lasted $3\frac{1}{2}$ hours, and, while this seems a high percentage of forceps delivery, it is stated that it is not above the average for that clinic. In 5 cases, forceps was applied without chloroform, but in the others it was administered.

Of the children, 5 were dead-born; 1 in a case of contracted pelvis with prolapse of the cord in which version and extraction were done. The second was a very bad, illy-nourished, premature child of a woman who had heart disease. The third, craniotomy for contracted pelvis; the fourth, premature child of seven months; the fifth, normal labor lasting 12 hours during which 11 injections were given. Of the 45 babies born alive, only 4 required artificial stimulation, and in 2 of these morphine had been repeated and the labors were very long. It is evident that hyoscine alone had no effect upon the child, and the morphine seems to have been the active agent.

The writers believe that in primiparæ the first injection must not be given too early, as it tends to stop the pains. The rule of giving the first injection when the os admits two fingers and pains are regular is a good one. In multiparæ, the injections cannot be given too early after pains have started. The second injection, $\frac{1}{450}$ grain of pure hyoscine, should be given about 1 hour after the first, whether the patient is still under or not. If this injection be delayed, the effect of the morphine tends to wear off, and the effect of the injections of hyoscine will not take place. These injections can be repeated with safety at hourly or three-quarter-hour intervals. It is well to avoid repeating the morphine in the latter part of the second stage, or the child may be partially asphyxiated. If the hyoscine is not taking effect, it is well to give the patient a whiff of chloroform, thus the hyoscine is allowed to work and the patient goes into the condition of "twilight sleep." Patients friends should be kept away, and, if thirsty, she should have an abundance of water. The catheter should be used during long labor. As soon as the baby is born, it should be taken to another room so she cannot hear it cry, as otherwise she may hear the cry and so piece together and imagine her labor.

Thirty-seven of the 40 patients got out of bed on the third day after labor. The writers believe that this method requires the constant attendance of a skilled person. It is of especial value in primiparae and in prolonged second stage due to a large head or slightly contracted pelvis. So far as amnesia is concerned, it is little use to commence the treatment during the second stage. The treatment is thought better than chloroform, and it does not so greatly lessen the uterine contractions.

Martin¹ adds his testimony to that of Haultain and Swift. He believes that the first dose should not be given until the pains have reached the point where the uterine reflex will not be denied. Pains should have become regular and strong. In the early stages of labor, he advises the application of a tampon soaked in a freshly prepared solution of 2 per cent. cocaine inserted through a narrow Ferguson's speculum against the cervix. He believes that the drugs make the pains less frequent and moderate, so that forceps will be used more often. The individual reaction of the patient to drugs should be studied and as small a dose as possible given. The administration of the second dose should be decided upon by the patient's condition and not by the number of hours elapsed. The memory test is unreliable, and cannot be taken as a criterion. If the anesthesia is too deep, the patient cannot concentrate sufficiently to make voluntary efforts to assist in the expulsion of the child. The state to be aimed at is one in which the patient does what she is told to do during the pain, although she may feel this keenly. After the pain is over, she talks irrelevantly for a few seconds and then drops asleep. Breathing should not be stertorous.

The method is suitable for general practice if the practitioner can give the case his undivided attention from beginning to end, and has a nurse who is experienced with it and thoroughly trained in obstetrics. If the injection is given when dilatation is complete, the pains may be slowed down by a full dose, and a very tedious labor develop. There is no dread of using chloroform in these cases, as less than usual is usually required.

In 15 cases, no child died, but one breathed badly and was resuscitated with difficulty. A dose should never be given within 2 hours of the birth of the child as nearly as it can be estimated. Chloroform is used when the head is being born.

It is interesting to note the sudden discovery of this old method which has been so thoroughly tried in America and upon which so little reliance is placed. In Edinburgh, a step further is taken than in Freiburg, for the patient's ears are carefully plugged with cotton-wool so that she may not be irritated by noise. If the drugs are not working properly, a little chloroform is given to assist their operation, and, in fact, chloroform seems to be used freely throughout the labor. There is nothing in the report of these cases which was not long since tried out by American obstetricians and which does not demonstrate the fact that morphine may often be given to considerable advantage during labor, and that

¹ British Medical Journal, January 6, 1917.

morphine is the reliable element in the treatment. Had these observers obtained sufficient experience with the method, they would have demonstrated its unreliability and the objections which others have observed. Apparently, nitrous oxide and oxygen as a substitute for chloroform during labor had not yet been discovered.

Labor Complicated by an Umbilical Trunk Presentation. Arteaga¹ describes a case of dystocia in a multipara of 33 in whom the os was dilated but the child failed to descend. Examination pointed to an incomplete presentation of the buttocks. After the membranes had been ruptured, the fingers immediately came in contact with the umbilical cord which protruded. The cord was followed to its umbilical insertion, the lower extremities of the child were sought but in the flexed position they could not be found. The presence of a monstrosity was suspected, but podalic version delivered a fine, perfectly formed child. The patient made a good recovery, and, on analyzing the case, none of the usual causes for such an abnormal presentation and position were present.

Traumatic Separation of the Symphysis Pubis Complicating Labor. Beach² reports the case of a multipara who had had difficult labors, with the history of large children. Following these labors, the patient had been confined to her bed with extreme sacral pain on motion, and was unable to walk for three months after delivery. From these symptoms she had fairly recovered.

On admission to the hospital, the patient was near term and the ends of the pubic bones were widely separated, and four fingers could be placed between them. Between the fingers placed in the vagina and this opening of the skin over the pubis, there was no bony tissue whatever, and but a thin band of fibrous tissue. An x-ray plate showed a wide bony separation 7.5 cm. Labor terminated spontaneously and the ends of the pubic bone came together to about 3 cm. of each other. A firm binder was applied, and five days after delivery an x-ray picture showed separation of $2\frac{3}{4}$ cm. The patient apparently made a good recovery for she was very active, and went home on the eighteenth day with a separation of over 2 cm. While she was lying upon the side, the separation was much diminished.

Eight and a half months after labor, an x-ray picture showed separation of 3.5 cm. of the ends of the bones, moving freely and coming together when the patient was lying upon the side. The fibrous band between the bones seems thicker then when she was discharged from the hospital. The patient has absolutely no symptoms, considers herself well and cares for a large family of children.

The case presents points of interest in the history of a trauma followed by four months of invalidism, then in two and a half years a normal pregnancy and labor; the ends of the pubis separated 7.5 cm. to permit the discharge of the head. A spontaneous recovery, with separation of 3 cm. with mobility of the bone but with no subjective symptoms.

¹ Rev. de med. y. cirug. de la Habana, 1916, xxi, 419.

² American Journal of Obstetrics, February, 1917.

Labor following Ventral Suspension. Caldwell¹ reports the case of a patient who had two full-term, living children delivered by forceps, one miscarriage at the fifth month. She was operated upon and had curettage, perineorrhaphy and ventral suspension. She subsequently became pregnant, the fetus was in transverse position, and, although the child could be turned by external manipulation, it immediately resumed its transverse position. She was admitted to the hospital in the fortieth week of pregnancy with some labor pains. On examination, the uterus was found firmly adherent to the abdominal scar and was contracting at irregular intervals. Fetal movements and heart sounds could be made out. The cervix was high, pointing directly backward and above the promontory, partly softened and dilated to about two fingers. No presenting part could be made out. Six hours after admission the uterus was tonically contracted, with a beginning retraction ring. The membranes were ruptured and there was dilatation of three fingers. Under an anesthetic the head and foot were found in the lower segment and a slow podalic version was done. The cord was not pulsating but the patient was in good condition, so she was allowed to come out of the anesthetic and a tight binder applied to correct a pendulous condition of the abdomen. Very slight traction was maintained on the child's foot in order to correct the direction of the cervix. Finally, the cervix dilated and the uterus contracted vigorously, but the child did not advance. The patient was again anesthetized, the breech slowly extracted and the aftercoming head perforated and delivered. Immediately after the birth of the child there was a copious hemorrhage and serious shock. The placenta was quickly removed. A tear of the cervix on the right side was discovered. A hot intra-uterine douche was given and the uterus and vagina tightly packed. The patient died in about two hours.

At autopsy, the anterior surface of the uterus was firmly attached to the abdominal wall by fibrous adhesions. The cervical tear on the right side extended obliquely upward for 12 cm. with a hemorrhage into the right broad ligament. A well-marked retraction ring was still present.

The second patient was a primipara who had been operated on three times, and had adhesions binding down the uterus. She entered Bellevue Hospital eight months pregnant, complaining of almost constant pain. The uterus was adherent to the abdominal wall from the symphysis to the umbilicus by an old scar. The cervix was high above the promontory and directed backward. The external os admitted one finger, the internal os was closed. The patient was given morphine and allowed to be in labor 14 hours, when a Cesarean section was decided upon. The old scar was dissected out and an opening accidentally made into the sigmoid, and the gut was still further damaged in dissecting out the adhesions and freeing the uterus. The dead child was delivered by section, followed by hysterectomy. The patient's condition was so grave that both ends of the cut sigmoid were clamped and sutured to the abdominal wall. The patient had severe vomiting, there was no movement from the bowel and she died 40 hours after operation.

¹ American Journal of Obstetrics, July, 1916.

The third case was a multipara who had Cesarean section because of premature separation of the placenta. From this she made a good recovery. During the present pregnancy she had frequently suffered from sharp, lancinating pains in the abdomen followed occasionally by vomiting, and had been admitted to two obstetric hospitals and discharged without relief. On examination, the abdomen was very much relaxed and there was an old abdominal scar, with the center about the umbilicus. Pregnancy was about seven months. The fetus could be felt apparently directly underneath the skin. The uterus could not be mapped out. The cervix was hard, sclerotic, and had a bilateral laceration.

In the hope that the cervix would soften, the patient was kept under observation for fifteen days. There was considerable bleeding from the cervix twice during this time, requiring the use of the tampon. There were no uterine contraction. The foul discharge continued. The temperature varied from 100° to 102°; pulse, 80 to 110, leukocytes varied from 12,000 to 25,000.

Finally, abdominal section was done. The old scar was dissected out, opening directly into a sac containing a dead, macerated fetus, and ill-smelling pus and gas. The posterior wall of the sac at the lower portion was made up of the uterus, the rest was composed of fetal membranes and inflammatory adhesions. The sac was adherent to the small intestine, mesentery, bladder, rectum and side of the pelvis. It included the uterus and was gangrenous. It was removed with great difficulty and considerable bleeding. Drainage was established through the vagina and abdominal wound. The patient died on the following day.

It is difficult to understand the delay in these cases, and the hope expressed that possibly spontaneous delivery or some comparatively simple vaginal operation would suffice. Section was resorted to so late that the patient's chance for recovery had already been lost.

Gangrene of the Sigmoid following Normal Labor. Kosmak¹ reports the case of a multipara whose first pregnancy ended in abortion at the fourth month. The second pregnancy ended in spontaneous labor without especial difficulty, and with moderate laceration. Pulse and temperature after labor were normal. In the afternoon of the following day the temperature was 102° F., pulse 160, the abdomen tympanitic, with marked rigidity on the left side. It was stated that this condition had come on suddenly and without warning. The patient was immediately transferred to the hospital in a condition of pronounced collapse. The pulse was faint and irregular, the abdomen somewhat distended and there were watery, involuntary movements. The uterus was well contracted. There were no tears in the cervix or vaginal vault and the lochia was normal in appearance. There was slight abdominal pain. As soon as the patient rallied somewhat, the abdomen was opened, and the descending colon showed a condition of advanced gangrene extending from the brim of the pelvis to the straight portion, about fourteen inches in length. No evidences of perforation were found.

¹ American Journal of Obstetrics, July, 1916.

There was a moderate amount of thin, purulent fluid in the lower abdomen. The patient's condition was so desperate that nothing could be done but insert drains. She failed to rally from her collapse and died shortly after the operation. Nothing was found at autopsy, or in the clinical observations which accounted for the development of the gangrene of the bowel.

Induced Labor followed by Spontaneous Rupture of Uterus. Cherry¹ describes the case of spontaneous rupture of a pregnant uterus presenting abdominal symptoms of a mild degree. The patient was a multipara, who, at the beginning of labor, had spontaneous rupture of the membranes. There was intermittent pain and dyspnea for 24 hours.

Examination indicated an eight months pregnancy, with apparent breech presentation. Fetal heart sounds could not be heard. The cervix was closed. The patient's chief complaint was dyspnea on lying down. A dilating bag was inserted through the cervix to promote dilatation. This, however, failed, and Cesarean section was resorted to. On opening the abdomen, there was blood in the peritoneal cavity, and the fetus and placenta were among the intestines. The fetus was a dead, encephalic monster. The uterus was well contracted and showed a longitudinal laceration on its anterior and lateral walls extending from the junction of the fundus and lower segment near the midline to the vesico-uterine peritoneal fold and laterally to the right broad ligament. There was no active bleeding until on manipulation there was fresh hemorrhage occurring in the laceration in the base of the broad ligament on the right side. On account of this, hysterectomy was performed. The patient made an uneventful recovery, and left the hospital on the sixteenth day.

The writer also reports the case of a patient seen in labor with shoulder presentation, the arm protruding and uterus tonically contracted. Under chloroform anesthesia, a difficult version was done, with the extraction of a dead child. The retained placenta was removed by manual extraction. Two days later, a cathartic was given, followed by free movements of the bowels, and the patient complained of severe abdominal cramps with nausea. Profound shock developed. On vaginal examination, it was found that several loops of the intestine had prolapsed into the vagina. The patient was immediately taken to the hospital and section performed, which revealed a considerable length of small intestine detached from its mesentery. Three feet of the jejunum was resected and a side-to-side anastomosis made. The uterus had a large longitudinal laceration of the lower segment which extended to the cervix at the vaginal junction. This laceration was closed with interrupted chromic catgut. The patient died shortly after the operation.

The case is interesting because of the fact that complete rupture of the uterus had occurred during operative delivery causing practically no shock or hemorrhage, and a period of 48 hours elapsed before prolapse of the bowel occurred. This was probably brought about by the administration of the cathartic, producing active peristalsis and at the

¹ American Journal of Obstetrics, June, 1916.

same time the use of the voluntary muscles of evacuation which increased abdominal pressure so that prolapse of the intestine occurred through the rent in the uterus. The uterine muscles contracted, grasping the intestines and holding them in a fixed position and simultaneously active peristalsis taking place, the intestine was torn from its mesentery.

The Induction of Labor. This useful operation finds its most successful field in women who have had a disastrous experience in the first labor, because pregnancy was prolonged or the child excessively large. In these cases the pelvis is normal, or very nearly so. The position and presentation may be normal but the slight disproportion present is sufficient to make birth dangerous alike for mother and child.

Another condition in which the induction of labor is clearly indicated is a condition of toxemia which does not yield to active medical treatment. Also in cases of cardiac disease, with failing compensation, there may come a time when pregnancy must be interrupted. In women suffering from tuberculosis, interruption of pregnancy is clearly indicated.

The *method* to be chosen varies with the experience and observation of different operators. In the hands of the reviewer, the following has been successful:

The patient is prepared for operation by having the bowels thoroughly emptied. Precaution is also taken to examine the blood and urine. At the patient's usual bedtime, after the abdomen and vagina have been prepared for operation, the patient is anesthetized with nitrous oxide and oxygen. Under anesthesia, the patient is catheterized and a thorough bimanual examination is made. The cervix is dilated as much as possible with the finger or fingers, and the exact position of the presenting part is clearly made out. Under the guidance of the fingers inserted within the vagina, a large, solid bougie is introduced, and, with a gentle, rotary movement, is passed upward and backward as nearly as possible in front of one of the sacro-iliac joints. All but an inch of the bougie is carried within the uterus. Another is also introduced and carried in practically the same direction, and, if possible, a third. Every effort is made to avoid rupture of the membranes, and, when the three bougies have been inserted, the vagina is moderately tamponed with 10 per cent. iodoform gauze. If the patient is restless and suffers pain, she is given morphine with atropine or codeine hypodermically during the night. Opinions differ as to the time that bougies may be left within the uterus, but, in the observation of the reviewer, 24 to 36 hours is needed to produce any definite effect. If but little has been gained, an examination is then made, preferably in the morning, the gauze and bougies are removed and the vagina gently irrigated with 10 per cent. lysol mixture. If the cervix has been shortened and but little dilated, it is usually possible to introduce one or two bougies without anesthesia. If necessary, however, the anesthetic may be repeated. If the cervix is obliterated and the os considerably dilated, it is unnecessary to introduce bougies again. After the obstetrician dilates the cervix as much as he can by the fingers, he may rupture the membranes and labor will surely develop. Bougies are preferable to dilating bags we believe

because their presence inflicts but little actual pain, certainly far less than that produced by bags.

If, after the rupture of the membranes, labor does not speedily develop, if the patient is frightened and highly nervous, a hypodermic injection of morphine and atropine will hasten the actual birth. If the patient is not nervous or excitable, $\frac{1}{30}$ grain of strychnine, given hypodermically or by mouth, will help greatly in bringing on labor.

While accidents are comparatively rare in the actual induction of labor, still abnormalities are sometimes encountered. On one occasion, the reviewer induced labor in the manner described, but the introduction of the bougie was followed by very considerable bright bleeding. This ceased on packing the vagina and cervix, but, on the following day when the packing was removed, the hemorrhage recurred to a less extent. There was an absolute failure of uterine contractions, and, at the request of the husband and wife, the patient was delivered by section, followed by hysterectomy. In examining the body of the uterus after its removal, the cause of hemorrhage became apparent. Syncytoma malignum was developing, and the occurrence of hemorrhage and the failure of labor to develop were readily explained.

On another occasion, the measures already described failed to induce contractions of the uterus, and the patient was delivered by section. During the operation, on examining the uterus, its wall was found to be abnormally thin and the site of several small interstitial fibroids.

That the bougie introduced into the uterus may separate a part of the placenta or even pierce the placenta has long been known. In the wards of the Maternity Department of Jefferson Hospital in one instance labor was induced by the introduction of bougies, uterine contractions developed and the patient was delivered without much difficulty through the vagina. One of the bougies was retained after the birth of the child and when the placenta was delivered it was found that this bougie had passed completely through the substance of the placenta. No harm, however, had been done.

In selecting bougies for the induction of labor the smallest size should never be employed. Those as large as the little finger are much preferable. The use of nitrous oxide and oxygen anesthesia for their introduction greatly facilitates the work of the obstetrician.

FAILURE OF INDUCTION OF LABOR FOLLOWED BY INFECTION. Cherry¹ reports the case of a multipara who was admitted to hospital stating that she had felt no fetal movements for two weeks. Examination showed the fundus of the uterus corresponded to a $7\frac{1}{2}$ months pregnancy. There was no evidences of fetal life. The patient was kept under observation for two weeks, hoping that she would spontaneously expell the uterine contents.

It was decided to induce labor and the method selected was the introduction of the modified di Ribes bag. The cervix was found hard and rigid owing to its sclerotic condition from profuse laceration, and it was necessary to dilate it with instruments before introducing the

¹ American Journal of Obstetrics, June, 1916.

bag. Twenty-four hours later no labor pains had developed nor was there softening or dilatation of the cervix. The first bag was then removed and a larger one introduced without anesthesia, to which was attached a four-pound weight. During the next 16 hours no change in the condition developed, and there were no labor pains nor softening, or dilatation of the cervix. The patient was nauseated and had a chill and elevation of temperature. After an attack of severe nausea with vomiting, the patient suddenly died 48 hours after the introduction of the first bag. Twelve hours after death, the body had swollen to about three times its usual size. A partial autopsy was performed, revealing a dead fetus in the uterus. The explanation for the swollen condition of the body was found in the fact that the gas-forming bacillus was present in the tissues.

INDUCTION OF LABOR IN CONTRACTED PELVIS. Guicciardi¹ publishes a paper giving the results of his experience in the induction of labor for contracted pelvis.

In making the diagnosis of pelvic contraction, he has used the *x*-rays with very considerable success. The ideal result in this operation is the spontaneous delivery of the child and every means should be employed to secure this. While the forceps may be a valuable instrument for ordinary delivery, in the case of the prematurely borne child but very little pressure is required to produce a serious injury or cranial lesion.

Embryotomy upon the living child is declined, and upon the dead child has a distinct field. The writer believes in cases where spontaneous labor does not develop, delivery by abdominal section is to be chosen. Pubiotomy has lost much of its prestige, and is obviously applicable only in a limited number of cases. The results of the induction of labor in moderately contracted pelvis show that if the operation is selected at a suitable time, and every effort be made to secure spontaneous expulsion of the fetus, the results of the operation are exceedingly good for both mother and child.

Ventral Suspension of the Uterus Causing Dystocia. D'Arcy² reports 3 cases of labor complicated by ventral suspension of the uterus. In the first, the woman was twenty days over term and had been in labor three days, with the child in the transverse position and no effacement of the cervix. On section, the uterus was bound to the anterior abdominal wall by a fibrous band which was attached to the posterior part of the fundus.

The second case was a labor at seven months in a patient who had had ventral suspension twelve months previously. There was internal hemorrhage from premature detachment of the placenta which was extensively thrombosed. The patient was delivered by Cesarean section.

Labor Complicated by Subcutaneous Emphysema. Milne³ describes a case of subcutaneous emphysema during labor. The patient was a primipara, aged 22, apparently normal and healthy and showed no

¹ *Annali di Ostetricia e Ginecologia*, 1916, Nos. 1 and 2.

² *Medical Journal of Australia*, 1916, ii, No. 4.

³ *British Medical Journal*, February 24, 1917.

signs of disease of the heart and lungs. Pelvic measurements were ample. There was some edema of the ankles, but the urine was normal. Labor lasted 17 hours, the first stage 14 hours. About an hour before a male child was born, the patient stated that she felt something burst about her head or face and there was intense swelling of the right eyelids. After labor the patient complained of slight substernal uneasiness but felt fairly well otherwise. On pressing over the face there was typical crackling except on the forehead and chin. This could be made out over the neck and anterior chest wall down to the level of the breasts, over the whole of the back on the right side as low as the margins of the ribs, and on the left side down to the angle of the scapula. On percussion, no superficial cardiac dulness could be made out, while at the right apex the note was somewhat altered. The breath sounds were normal. The child weighed $9\frac{1}{2}$ pounds. It seemed from the physical examination that the seat of rupture was in the neighborhood of the right apex with the pleura adherent. The temperature fell from 100.4° F. to normal within 12 hours and the subcutaneous crackling had disappeared in five days.

Chronology of the Founders of the Forceps. Doran¹ publishes a chronology of the founders of the forceps from 1569 to 1799. He begins with William Chamberlein who lived in France and landed at Southampton. In 1576, was born Peter, the younger, his son who, in 1596, was admitted to the Company of Barber Surgeons of which body his father was a member. Peter was licensed to practice midwifery in 1600, and his son, Dr. Peter Chamberlein, was born in 1601. We find the Chamberleins criticized by the authority of the College of Physicians for practising physic instead of confining themselves to surgery. This went so far that in 1612 the older Peter was imprisoned in Newgate, but was set free after great resistance from the College. The younger Dr. Peter Chamberlein graduated at Padua when only 18 years of age, and his name appears in the Annals of the College of Physicians of London. He was afterward accused of prescribing for a male patient which was considered a grave offense in those days if the action was done by an obstetrician. In 1628, the elder Peter was court obstetrician to Queen Henrietta Maria. She had miscarried with her first child, having no midwife or physician about her. It so happened that Chamberlein was alone with the Queen at the time when the child was born, and, during the period in which this occurred, this was one of the first instances in which a man had assisted at the birth of a child. In 1630, was born Hugh Chamberlein, and shortly after occurred the establishment of a corporation of midwives with Peter Chamberlein as Governor. As early as 1634, there is evidences that the profession knew that the Chamberleins possessed instruments of iron which they used in aiding women in difficult birth, although a complete and exact description of these instruments did not exist.

In 1650, Palfyn was born at Ypres, destined to be a rival of the Chamberleins in the early discovery and introduction of the forceps.

¹Journal of Obstetrics and Gynecology of British Empire, June-August, 1916.

In 1663, occurs the narration that the accoucheur to the French Court, only 14 years of age, had successfully conducted a confinement. In 1670, Hugh Chamberlein went to Paris and was asked by Mauriceau to deliver a rachitic dwarf, aged 38. He failed to do this, and the woman died. The death of Peter Chamberlein in 1683 occurred at Essex, where a year afterward the Chamberlein forceps was discovered. An idea of what the practice at the time was in obstetrics may be obtained from the fact that, in 1688, the senior surviving Chamberlein, Hugh, was prosecuted by the Censors of the College for malpractice. He was treating a patient six months pregnant said to have pleurisy, and to this unfortunate woman he gave four vomits, four purges and three bleedings of 8 ounces each within nine days and then salivated her freely. She miscarried, and died. In 1692, Chamberlein attended the Princess of Denmark, delivering her of a son who died immediately afterward. The fee on this occasion was 100 guineas. Obstetricians were still, in 1699, called men midwives, as is seen in some documents of this period. In 1720, Palfyn showed his iron hands before the French Academy of Sciences, and, in 1724, this instrument was illustrated, and illustrations concerning it were in circulation. In 1726, Giffard published a report of a case delivered by forceps. Chamberlein, the most famous man midwife died of gout in 1728, the last of his ancient family, and Palfyn died in 1730.

In 1733, an address on prenatal baptism by the use of the syringe was presented to the Sorbonne. Obstetric literature was enriched at this time by papers containing drawings of various forceps, and the instrument had then become thoroughly familiar to the profession. It may be remembered that in 1741, William Hunter came to London and lived with Smellie, who was then in active practice, and who, in 1742, published his *Treatise of Midwifery*. Shortly afterward Smellie introduced his special lock for the forceps. In 1748, William Hunter was elected one of the surgeon men midwives to the Middlesex Hospital and soon after to the British Lying-in Hospital. Smellie's curved forceps were described in an essay in 1752.

A Norwegian obstetrician, Jans Bing had at this time a large obstetric practice and used a solid-bladed forceps with long handles which could be detached. In 1753, Smellie used a long double-curved forceps, with which, on one occasion, when the feet and hands of the child presented, Smellie brought down the body and delivered the head with his forceps. He retired from practice in 1759. He died in 1763.

The perineal curve in the forceps was invented by Johnson in 1769. Pean's forceps were adopted by Baudelocque in 1781.

Ectopic Pregnancy at and Beyond Full Term. Jardine¹ reports the case of a woman, aged 30, primipara, who was three weeks over full term. Labor had come on at full term, but pains ceased on the expulsion of what was thought to be a piece of the placenta. The patient alleged that she still felt movements. She had severe abdominal pain and a bloody vaginal discharge and some symptoms of appendicitis.

¹ Glasgow Medical Journal, 1916, No. 4, p. 137.

A diagnosis of ectopic pregnancy was not made. After these attacks of pain, the patient became fairly comfortable. When examined under anesthetic, the top of the tumor was close to the diaphragm, the head was high up and the fetal parts were distinct. There were no heart sounds or signs of life, though the patient stated she had felt movements on the day of admission. The non-pregnant uterus was enlarged and pushed over to the left side. The cervical canal would admit one finger, the uterine cavity was empty and a diagnosis was made of ectopic pregnancy beyond term with a dead fetus.

At operation, only the outer layer of the fetal sac was opened. The hand was carried between the sac wall and the amnion and the layers completely separated without difficulty. A placenta was in the lower part of the abdomen and easily removed without bleeding. As much of the sac as possible was removed without doing great violence, but the larger part of the sac had to be left. A firm packing with iodoform gauze was introduced into the abdomen and the wound partly closed. Convalescence was uninterrupted, but the scar was weak where the drainage had been inserted.

Eight months later the patient returned for treatment for the hernia at the site of the drainage scar. It was found that all trace of the sac had disappeared. There were no adhesions, but Douglas's pouch had been partly obliterated.

Lee¹ describes the case of a patient admitted to Cook County Hospital, Chicago, giving her age as 36 years, married 20 years, one pregnancy 16 years before admission. The child was delivered by instruments, and was living and healthy. There had been no miscarriages. The patient had menstruated normally, with very slight interruption. She had suffered for some months with cessation of menstruation and almost persistent nausea and vomiting. The breasts at first had been large and tender, but lately had become flabby. The abdomen had been distended for some time and the patient complained of feeling bloated.

On examination, the patient was badly developed, rachitic, the breasts flabby, atrophied, the abdomen distended, and fetal movements could be seen and felt. The pelvis was contracted, the urine and blood practically normal. A few hours after entrance, the abdominal pain ceased.

Examination with Röntgen rays showed the breech of the child at the level of the iliac crest with the back anterior, while the fetal head was under the costal arch in the region of the stomach. During the week following, there was a return of abdominal pain, but no other change.

At operation, the fetus was lying in a thin sac anterior to the intestines and omentum, and, when this was opened, the child was found living and delivered. It was eighteen inches long and weighed $4\frac{1}{2}$ pounds. The placenta was in the pelvis adherent to the broad ligament, uterus and sigmoid. The attempt to remove it brought about a severe hemor-

¹ Surgery, Gynecology and Obstetrics, March, 1917.

rhage which was checked by packing, and the abdominal wall was closed. The patient was considerably shocked, but rallied. The operation was followed by great restlessness, with a profuse discharge of serosanguinous fluid. On the twenty-third day after the operation, the patient died of exhaustion. The child, a female, suddenly died a half-hour after delivery.

The notes of other cases are appended.

Oastler¹ reports 106 cases of ectopic pregnancy. These were observed over a period of years and were under the personal observation of the writer. A study of these cases was undertaken to determine whether, through them, new facts of interest could be learned, whether the clinical picture in the cases corresponded with written descriptions and to emphasize certain features of the disease which seem important to the writer.

So far as *etiology* is concerned, in the 106 cases there was a previous diseased condition of the uterus, ovaries and tubes in 20. Two cases gave a history of abscess in Bartholin's glands, 5 had previous ectopic gestation; 2 fibroid tumor of the uterus; 3 ovarian cyst; 2 appendicitis; 1 had been operated on for prolapse and ventral hernia. This makes a total of 38 cases in which there could be found some previous diseased condition which might predispose to ectopic gestation. Of the remaining 72 cases, no cause for the pathological condition was evident. There were no congenital defects reported from the microscopic study of specimens, and the macroscopic appearance of the sound tube was normal.

The *age* of the patients ranged from 19 to 43 years; average $29\frac{1}{2}$. In 50 cases the disease occurred before 30; in 28 before 25; in 22 before 35.

In 72 cases the *time of the occurrence* of the disease from the date of marriage could be obtained. The earliest was $1\frac{1}{2}$ months, with no history of infection, and the latest was 18 years without history of previous infection. In 16, ectopic pregnancy occurred about 5 years after marriage; in 18, about 8 years; in 12, about 15 years, and, in 26, within the first 2 years of married life. In 34 cases no data could be obtained.

In 60 cases the time of the occurrence of the disease from the last pregnancy could be ascertained. In 7, this was within eight months of a previous gestation; in 43, within 2 years; in 10, about 5 years. Out of 85, there were 45 cases which followed labor at full term and 40 followed miscarriages. Nine patients had not been pregnant before, the ectopic pregnancy occurring at intervals of six weeks to 10 years.

The history of dysmenorrhea was obtained in 47, and of 96 cases, 51 were said to have normal menstruation, 30 profuse, 6 scant and 9 irregular. In 5 patients ectopic pregnancy recurred.

When we searched for a *cause* for the disease, this could be ascertained in about one-third of the cases. In the other two-thirds no cause could be obtained. The age, the marriage period, relation and point of time to previous normal pregnancy or miscarriage and previous sterility appeared to have no particular bearing on the etiology. In

¹ Surgery, Gynecology and Obstetrics, February, 1917.

1 case ectopic gestation occurred while the mother was nursing her child and menstruation had not yet returned after her delivery. It is possible that 1 case recurred because it was in the stump of the tube that had been the site of previous ectopic pregnancy.

When one studies the *pathology* of the condition, it is found that ectopic gestation occurs about as often on one side as the other. Inflammatory conditions of the tubes are more common on the left side, and, if this were the cause of ectopic gestation, one would expect to find it occurring more frequently on the left side, but such is not the case. The pregnancy is located in the inner half of the tube about as frequently as in the outer half, but interstitial and ovarian pregnancies are of rare occurrence. Tubal abortion is the variety of rupture most commonly found, but, when the pregnancy is not tubal, erosion is more frequent from overdistention. Severe hemorrhage may occur from tubal abortion and erosion of the tube, and this may not uncommonly attack the ovarian artery. Rupture into the broad ligament is rare.

Double ectopic gestation is uncommon, but ectopic may be associated with normal intra-uterine pregnancy, and interstitial ectopic gestation may end in the discharge of the ovum into the uterus where it becomes attached and continues to grow. It is possible for ectopic gestation to occur twice on the same side. These pregnancies rarely go longer than six weeks, and a case which persists longer than three months is exceedingly rare. In ectopic gestation the embryo usually dies and may be discharged into the abdominal cavity and absorbed, or be absorbed as tubal moles, or the fetus may disintegrate and form an abscess in the abdominal cavity.

So far as *symptoms* are concerned, one may recognize two varieties, the acute, violent form with excessive hemorrhage and shock, and the subacute form with one or two minor attacks of acute pain lasting over a considerable period, in the intervals of which the patient may be fairly well or be disturbed by daily pain or abdominal tenderness. So far as uterine hemorrhage is concerned, it may be continuous or intermittent. Of the 106 cases, 15 were of the first type and 91 of the latter.

In 88 cases, the pain was intermittent and cramp-like in 62; continuous and dull in 15; sharp but continuous in 8, and slight in 3 cases. In 26 cases there was a history of sudden collapse, falling to the floor or being carried to bed. Out of 106 cases there were single attacks of pain in 26; two attacks in 16 cases and several attacks in 64 cases. In all but 11, uterine bleeding was associated with attacks of pain. In 13 patients pain came first; in 19, bleeding was first, and both together in 23 out of 55 cases. Pain was generally referred to one or the other side of the abdomen. In 3 cases both sides of the abdomen were equally painful, while in 2 the pain was referred distinctly to the left side.

When symptomatology as a whole was considered, ectopic gestation is for the most part a subacute disease in which the symptoms continue with one or more exacerbations for one or more weeks, the patient gradually growing weaker and weaker until relieved by operation or death of the embryo. So-called acute, or violent, cases are very rare. Ectopic gestation can be compared to a more or less severe type of

salpingitis, many of whose symptoms it possesses. The pain of ectopic gestation is much like the cramps in intestinal colic and of corresponding importance, and is often mistaken for it. With the pain there are often associated faintness, vomiting, chilly sensations and constipation, which might easily mislead physicians to consider the case one of intestinal disturbance. It has always been supposed that each case gave a history of a missed menstrual period, but in the majority of patients this is not true, and this fact should serve as a warning against being misled by the history of a case. Irregular bleeding often accompanies salpingitis, so this is not of great and positive value. These cases do not have normal temperature, the range usually extending from 99.5° F. to 100.5° F. The pulse-rate and blood-pressure are of little diagnostic importance, except in cases in which frequency of the pulse is out of proportion to the temperature. In the majority of cases, leukocytosis is present, and a low red count generally accompanied by a high white. It is significant that, in the greater majority of patients, albumin and casts are discovered in the urine. Irritation of the bladder and rectum is far from uncommon. Abdominal examination gives the usual signs of peritoneal irritation more or less pronounced, and bimanual examination will usually find a mass in the pelvis. These symptoms, however, may also be found in salpingitis. Of especial value are exquisite tenderness out of proportion to other local symptoms, the situation of the uterus in the normal position, movable and not retroverted and fixed, a boggy sensation to the mass in some cases, the enlarged uterus and soft cervix and very rarely the discoloration of the mucous membrane of the vagina. In many cases, however, there is nothing to guide the obstetrician but the exquisite local tenderness.

So far as *diagnosis* is concerned, there is no one diagnostic symptom peculiar to this condition. If all the factors are taken into consideration, diagnosis is usually comparatively easy. When all the classic symptoms are present, diagnosis is not difficult, but, unfortunately, only a small portion of them may be present in any given case. Out of 106, 6 were diagnosticated before rupture; 70 after, and in 30 the diagnosis was improperly made.

Regarding the *mortality*, 7 patients among the 106 died, 5 of them were of the acute type, 1 died while being prepared for operation; 2 without operation; 3 following operation and, 1 suddenly 13 days after operation from pulmonary embolism. The mortality is comparatively low, and with proper care these patients usually recover. Among these cases, all but 4 were operated on as soon as the diagnosis was made. Of the 4 excepted, 2 were in such acute shock from loss of blood that it was deemed advisable to wait in the hope that the patients might react. The remaining 2 died before the abdomen was opened.

From the study of these cases, it seems indicated that operation should be done at once, removing from the abdomen the affected tube, the fetus, placental membranes and blood. All acute cases should be operated upon immediately excepting if they are in the last stages of shock. These patients should be watched carefully for a short time in the hope

that they will recover. When the patient is almost moribund, it is the better part of wisdom to wait for a short time hoping for improvement. If, during this time, there is no sign of improvement, operation should be performed. Two patients bled to death, in both of whom the ovarian artery had ruptured and 1 was an interstitial pregnancy. If it is shown that patients can bleed to death, as little delay as possible should be practised in operating upon them. The abdominal route was chosen in all cases as it is unquestionably the only safe procedure to follow.

Delivery by Abdominal Section. Davis,¹ in a paper read before the Medical and Chirurgical Faculty of Maryland, outlines the scope of delivery by abdominal section and calls attention to the fact that in the modern practice of obstetrics, highly contracted pelvis is one of the simplest complications of parturition, and that abdominal section finds its most recent success in dealing with rupture of the uterus and foci of infection in the pelvic or abdominal organs, including appendicitis. Cases in which pelvic or abdominal tumor complicates pregnancy also indicate section. In premature separation of the placenta, whether normally situated or placenta previa, there is a difference of opinion, but a considerable number of obstetricians of experience believe that such cases require abdominal section. Of the two, abdominal section is much more efficient than vaginal. As regards eclampsia, delivery by abdominal section is rarely indicated, and the prompt and thorough treatment of the toxemic condition underlying eclampsia is of primary importance.

A very interesting question arises in this connection as to *what conditions justify sterilization of the mother after abdominal section*. If, at operation, there is abundant evidence that the uterus is in a state of active septic infection, the body of the uterus should certainly be removed. These are best treated by leaving the stump of the septic cervix outside the peritoneal cavity, removing the Fallopian tubes and the body of the uterus. The removal of the ovaries or their preservation must depend upon the age of the patient and the condition of the pelvic tissue at the time of operation.

It is stated that in women who are imbeciles, epileptics, insane or degenerates, the life of the mother should be saved without regard to the criminal character of the individual, but that the consent of the parents or guardian should be obtained for sterilization. If this is not available, medical consultation to determine the propriety of the step should be held.

In the opinion of the writer, husband and wife will rarely request that sterilization be performed unless there has been a history of previous unsuccessful and dangerous parturition. Repeated section is so successful that patients should be warned against the termination of the power of procreation because they have passed through one unsuccessful effort. The indications for postmortem Cesarean section are clear, and the writer has had 3 cases of this kind.

¹ Surgery, Gynecology and Obstetrics, October, 1916.

Delivery by abdominal section should be performed by well-trained obstetricians in maternity hospitals.

The writer gives his results in 129 classic Cesarean sections, 50 hysterectomies in which the stump was dropped and the abdomen closed without drainage; 32 Porro operations in which the stump was fastened by clamp outside the abdominal wound; 3 extirpations of the uterus following delivery, and 2 sections performed at the moment of maternal death, a total of 216 operations. These cases were divided into those in fair condition at the time of delivery, with no fatal disease of the viscera and uninfected, and those who were, at the time of delivery, infected or suffering from some fatal disease of important viscera. Of those cases in good condition, there were 151, with 1 maternal death, a mortality rate of 0.066 per cent. Of the cases infected and in bad condition, 60 with 16 deaths, a mortality rate of 26+ per cent. Of the entire series the mortality rate was 8 per cent. The 1 case of death in those patients in good condition occurred from peritonitis from the *Bacillus proteus vulgaris*, the source of which could not be discovered.

The success of antiseptic measures has largely eliminated septic infection from cases admitted to maternities in good condition. Against degenerative changes of the heart muscle, kidneys, and liver the obstetrician in some cases is powerless.

It has been readily demonstrated that so far as the conditions under which the patients were operated upon are concerned, they were the average and there were no especially favorable conditions.

Before the Section on Obstetrics of the American Medical Association, June, 1916, the writer¹ presented a paper on "Obstetric Surgery a Modern Science." In this he covered the ground already given in the former paper, but drew attention to some of the older errors which he believed interfered greatly with the success of modern obstetric surgery. Thus, in the use of forceps, disregard of the rule that forceps must not be applied until the head is well engaged, had produced a fetal mortality of from 33 to 38 per cent. He also warns against the indiscriminate Cesarean section, and believes that in many cases craniotomy should be chosen. Obstetric surgery is comparatively modern science and only those men who have modern training can decide properly upon the performance of obstetric operations and carry them out successfully.

Meddlesome Midwifery in Renaissance. De Lee² states that the morbidity for both mother and child as the result of labor is excessively high. While, according to census, 4464 women died in the United States of sepsis in 1914, it may be estimated that 100,000 women in the United States were infected by puerperal sepsis during this time. Much of the ill-health of women who have had children is due to the fact that they have been injured, and that lacerations have not been properly repaired. Such a condition is often accompanied by infection and subinvolunt. The desire on the part of the profession and the public to shorten the time of labor as much as possible and to make it

¹ Journal of the American Medical Association, October 14, 1916.

² Ibid.

completely painless has induced obstetricians to anesthetize patients and to deliver them before the birth canal is properly dilated. As a result injury and laceration occur which might have been largely avoided. The indiscriminate use of anesthesia predisposes to relaxation, hemorrhage and infection. The effort to make women bear down and press the child out before the cervix is fully dilated frequently results in injury. Frequent vaginal manipulation on the part of the physician is also injurious. The writer calls especial attention to the danger attending the use of pituitrin and states that, in his personal knowledge, rupture of the uterus has been produced in this manner twice, while less serious injuries are not infrequent. The abuse of the obstetric forceps is also a serious matter.

OBSTETRIC SURGERY.

Cesarean Section. THE END-RESULTS. Humpstone¹ has studied the permanent results of 148 cases of abdominal hysterotomy performed by seven obstetricians in the service of two hospitals. These cases occurred among 6493 deliveries. Among these cases operated upon, only 27 had no labor and were purely elective cases.

The most frequent indication was dystocia, due to disproportion. This occurred in 109 cases, in 3 of which there was prolapse of the cord also. He draws attention to the fact that pelvimetry alone cannot be relied upon to give an accurate idea of the possibility of spontaneous labor. He believes that at present the test of labor is the only guard against radicalism. He considers rectal examination during labor as of great value in preventing septic infection.

Ventral fixation, which left the uterus in an abnormal condition, was the cause which called for operation in 10 cases and in 1 case from an operation previously done on a ligament. In 1 case the uterus had been anchored by a plastic operation, and in labor had torn itself away from the tissues to which it was sutured. There was also 1 case of vaginal stenosis and 1 of bony tumor. Three patients had impending rupture of the uterus, but the children were born alive, and mothers and children did well. In 3 cases there were ovarian cysts obstructing labor. Impacted face presentation with the chin posterior, and the uterus contracted tightly, was the cause for three sections. Accidental hemorrhage was the indication in 2 operations, in 1 of which the hemorrhage was produced by a bougie used to induce labor. There were indications for operation in but 1 case of placenta previa and the writer would limit the operation to a primipara at term with undilated cervix and pelvic canal. Eclampsia furnished an indication for 10 operations without maternal mortality.

The maternal mortality in the series was 2, 1.357 per cent.; one a ventral fixation case dying of sepsis, and the other a primipara in poor general condition who had a streptococic infection. All the infants were born alive. Eight died before leaving the hospital, of whom 3 were premature.

¹ American Journal of Obstetrics, March, 1917.

Thirty-three and one-third per cent. had morbidity during the puerperal period, 3 had severe sepsis and 1 recovered after a prolonged illness. One hundred cases had no temperature over 101° F. Primary union occurred in 137 cases.

In the after-treatment, a flat sand-bag weighing 5 to 8 pounds was kept on the abdomen for the first few days to prevent distention.

The incision employed was a median, high, short incision, two-thirds above and one-third below the umbilicus, through the rectus muscle. A preliminary hypodermic injection of 15 minims of pituitary extract was given.

In considering the end-results, a maternal mortality of 1.35 per cent. is certainly a favorable showing, compared with other abdominal sections. In badly infected cases the extraperitoneal treatment of the stump is clearly indicated. In the effort to find out the condition of patients, 75 replies were obtained by letter or interview. Of these, 60 stated that they recovered rapidly after leaving the hospital, and that the general health was as good, or better, than before. Of the other 15, 9 complained of abdominal pain, apparently from adhesions; in 1, the pain was so great as to lead to a second operation. The patient had previously had ventral fixation and the uterus had become adherent to the scar of operation and required hysterectomy. Adhesions form not infrequently after Cesarean section and there seems to be no way to prevent them.

The abdominal scar after Cesarean section is not likely to give way, and hernia is not frequent; 4 cases have come to the attention of the writer. Three patients complained of cystitis; 1 had pyelitis delaying recovery; 2 patients had symptoms of continued nephritis after passing through eclampsia; 1 had phlebitis in the femoral vein.

Menstruation was reported regular in 64 of the patients; irregular in 9, of whom 7 were patients who had complained of pain in the abdomen from adhesions. It seems fair to conclude that abdominal delivery has no greater effect than pelvic delivery on the future health of the mother. As regards the effect of the operation upon future child-bearing, in this series 2 women only reported having had miscarriages; 23 had two Cesarean operations; 4 had three. Eleven of these operations had been performed since the time covered by this series of cases without fetal or maternal mortality. Two women had been delivered of living babies through the vagina, one of them twice since her Cesarean operation. Both of them had no disproportion; one had been operated on for accidental hemorrhage and one for overgrown child. The writer states his belief that whenever Cesarean section is done for disproportion, succeeding births should be in the same manner. From this study the writer concludes that the evolution of Cesarean section is a permanent scientific step in advance, based on sound surgical principles.

THE PRESENT STATUS OF ABDOMINAL CESAEREAN SECTION. Newell¹ calls attention to the fact that some operators resort to Cesarean section upon very slight indications, exercising no care in the selection of

¹ Journal of the American Medical Association, February 24, 1917.

proper cases, with the result that the unpublished results of the operation are exceedingly bad.

To study this question, Newell investigated 4 cities of from 25,000 to 40,000 inhabitants within 40 miles of Boston, and found that in "A," no Cesarean section had terminated in recovery; in "B," the mortality was 60 to 75 per cent.; in "C," Cesarean section was supposed to be universally fatal when performed by local surgeons, and, in "D," Cesarean section in average cases has a mortality of 10 to 20 per cent. It has recently been adopted as routine method of delivery in eclampsia with an increase of maternal mortality to 50 per cent. In well-equipped private hospitals in Boston, 7 patients, the writer states, are known to have recently been lost after Cesarean section by trained surgeons.

A study of the causes which have led to these bad results shows that the primary condition is a lack of knowledge on the part of the average practitioner as to what constitute the contra-indications to an abdominal delivery, and this points to a fundamental error in the teaching of obstetrics. The student sees the operation performed under proper conditions with brilliant results, and is impressed with the ease of the operation as compared with difficult pelvic delivery and the satisfactory after-results for both patients. He is not sufficiently taught in regard to the bad results which follow the operation if performed in improperly selected cases, and his subsequent reading does not educate him on this point.

In general practice the standard set for obstetric care is so low that the study of the patient during pregnancy is largely neglected, with the result that many patients are allowed to come into labor who have never been carefully examined. When these patients begin to fail in labor Cesarean section is chosen as a last resort for the sake of the child.

If patients are selected for section who are poor risks, although some children may be saved, a larger number of mothers will be lost. Cesarean section performed by competent surgeons on a healthy, uninfected patient under proper conditions is an operation which should be attended by little, if any, higher mortality than is to be expected in ordinary clean abdominal surgery in patients who are considered good risks. If any one of these conditions is disregarded, the prognosis is at once altered for the worse. Should, however, both husband and wife, for the sake of the child, after the risks of the operation have been fully explained to them, demand section, the obstetrician may accede to their request. The condition of the patient as regards the possibility of uterine infection and complicating disease are of the greatest importance; also, the circumstances under which the patient is placed regarding possibility of a septic infection. Of great importance is the skill of the medical attendant to deal with the special problems which the case presents. The problem of this operation is often complicated and its solution extremely difficult. In doubtful cases, vaginal delivery should be advised.

The most essential factor for success in Cesarean section is that cases for operation should be selected with the greatest care, and that

the operation should be refused to all patients in whom uterine infection can be demonstrated or is suspected, provided delivery can be accomplished by some other means. If, however, abdominal delivery seems to be the only possible solution of the problem, the uterus should be delivered and the peritoneal cavity carefully protected before the uterus is opened, and after the delivery of the child and placenta, complete hysterectomy be performed, it being a violation of all surgical principles to return an infected uterus to the abdomen to act as a source of peritoneal infection. If infection is only probable, but not positive, it may be justifiable for the sake of the child to perform intraperitoneal operation and leave the uterus. In doubtful cases it is best to refuse abdominal delivery.

Of those causes which tend to infect patients, vaginal examination is by far the most common, and repeated examinations place the patient in the suspect class. Attempts at delivery through the vagina increase the risk of abdominal delivery still more, and such a patient is an exceedingly bad risk for Cesarean operation. Craniotomy or pubiotomy are to be selected. It is true that many of these patients might recover if delivered by abdominal section, although an attempt had been made with forceps, but this will not save the smaller number who die. If there has been a prolonged and violent effort to deliver through the vagina, delivery by section should be declined. If a patient has been long in labor, this greatly increases the risk, and the so-called test of labor is often a great detriment. While a few hours of moderate labor will do no harm, a complete test in the second stage is not advisable. Doubtful cases should be thoroughly examined, if necessary by anesthesia, before they come into labor, and if it is impossible to engage the head in the pelvis and the head overrides the symphysis, Cesarean section should be made an elective operation.

Patients in whom the membranes have long been ruptured, although they may not have been examined, are especially prone to develop infection. Early rupture of the membranes in itself is not an indication for the operation, no matter what the presentation or position of the child. If, however, there is good reason for the operation, and the membranes rupture, the patient should be delivered by section as soon as possible.

Should acute infection of any sort, local or general, be present, the patient should be considered a poor risk for abdominal delivery and operation should be declined, if any other method of delivery is possible. The prognosis of Cesarean section is rendered more grave by chronic disease complicating pregnancy, such as nephritis, diabetes, and heart lesions. While in many cases the operation may be advisable in spite of the complications, or because it has a less risk than a difficult pelvic delivery, still the results in these cases cannot compare favorably to those obtained in patients in good general health.

In individual cases, Cesarean section may be indicated in preëclamptic toxemia and eclampsia, but, as a rule, the patient's chances are much better without section.

Proper surroundings are also essential, and a tenement house is not

the proper place for abdominal surgery when a hospital is available. There must be good after-care to secure a successful result. Again, there must be an experienced operator and not one who is poorly trained. While the operation itself may technically not be a difficult one, still the better the operator the better are the results.

If the contra-indications outlined are scrupulously regarded, the writer believes that Cesarean section is as safe as any major surgical operation, and is subject to the ordinary risks of surgery, such as embolus, ether pneumonia, and other complications. The mortality should be less than 1 per cent. for the mother. To attain this, patients should have been thoroughly studied during pregnancy and properly prepared for operation, and this should be performed at a set date before labor begins or very early in labor under proper conditions. As emergency surgery is always unsatisfactory, so an emergency Cesarean operation is no exception to the rule.

The indications for the operation may be divided into two general classes. Those in which, for some reason, an attempt at delivery through the pelvis is practically sure to be followed by disaster for mother or child, or both, and those in which abdominal delivery offers less dangers to mother or child or both, although it may be possible to deliver the patient through the vagina. The practical distinction between the two classes of indications depends on the results obtained by abdominal section. In competent hands, published statistics would indicate that the field for the operation is very broad, but, if the truth is known, it would be found that the operation should be strictly limited.

In the opinion of the writer, most bad results are due to failure to appreciate the criteria which should pertain in the selection of cases, contra-indications are not recognized, or the operator has bad technic. If the obstetrician be competent, the indications for the operation become broad. It must be remembered that many believe that a patient once delivered by section has a uterus which cannot bear the strain of subsequent spontaneous labor. Such patients must have hospital care. In a young woman who may have several children, it may not always be wise to perform Cesarean section for indications which are temporary in character, as eclampsia or placenta previa.

The principal indication for section is, and always will be, serious disproportion between fetus and pelvis. One of the most difficult problems in obstetrics is to determine the degree of disproportion, and to estimate the liability of the individual to serious dystocia. If disproportion is marked, a primary Cesarean section at a time of election should be advised without hesitation, and this in spite of the fact that in some cases the patient might be delivered by a difficult pelvic delivery. The risk, however, of serious laceration for the mother and danger to the child's life is too great to be properly assumed by pelvic delivery. If disproportion is only moderate, and the patient is young and a primipara, the test of labor will ordinarily be the proper one. If, however, her nervous and physical equipment is such that she cannot bear the strain of a prolonged second stage, then Cesarean section is the operation of choice,

Women whose previous labors have been very difficult, and who have lost children by difficult pelvic delivery are proper subjects for section, even if there be no definite pelvic contraction. With these should be included women who have suffered serious pelvic damage in previous labor which has been repaired unless there is some other factor in the case which makes them bad abdominal risks. This is especially true of patients who had severe perineal laceration or vesicovaginal fistula.

The writer believes that patients having had Cesarean operation, should be so delivered in subsequent pregnancies. This is true because of the risk of rupture of the uterine scar from which the mortality is higher than mortality from repeated Cesarean section. In eclampsia, placenta previa, and such indications which are not permanent, Cesarean section is not indicated, unless for the sake of the child or where it may be thought that section may save the life of the mother. In these cases the family should be informed regarding the future of the patient when the operation is advised.

Dystocia resulting from previous operations may make Cesarean section necessary in subsequent labors. Ventral fixation or an improperly chosen method of suspension, resulting in fixation and amputation of the cervix, are especially liable to cause trouble in subsequent labors, and it may be necessary in these cases to select Cesarean section as the better choice.

In primiparæ with marked valvular lesions of the heart, especially stenosis, Cesarean section will, in many cases, be the safest method of delivery, especially when cardiac compensation is failing. In heart cases it is necessary to avoid all strain, and while it may be possible to deliver many of them through the vagina, still Cesarean section before labor begins will be safest. The advantages of section comprise the fact that the future health of the patient will be vastly better if she avoids unusual strain in labor.

Women over 40 in their first pregnancy are properly considered cases for abdominal delivery. Such a patient may never have another child, and hence the risk to the child should be made as little as possible. Again, delivery through the vagina is apt to result in laceration in these patients and this is avoided by Cesarean section. If there is also a slight pelvic contraction, the indication becomes absolute.

In premature separation of a normally situated placenta, it sometimes is necessary to remove the uterus to prevent death from postpartum hemorrhage. Here, again, the question of hospital accommodations is most important.

The general indications for the operation are some obstacle to delivery or the presence of some condition which renders the abdominal route the safer one for mother or child or both. Of the more general indications, none can be applied universally, but each must be studied upon the merits of the case. When it comes to borderline cases, the surroundings are of great value, and care should be taken to warn relatives of the patient that the best results cannot be obtained in unfavorable surroundings.

CESAREAN SECTION INDICATED FOR THE DELIVERY OF BREECH PRESENTATION. McPherson¹ publishes the results of his analysis of 3412 cases of breech presentation and delivery in 97,000 confinements in the New York Lying-in Hospital. He endeavors to include in fetal mortality only those cases in which the cause of the still-birth could be directly attributed to breech delivery.

So far as prognosis for the mother is concerned, the maternal mortality does not, and should not, differ greatly from that of vertex presentations in uncomplicated cases. The mortality in his series, including cases complicated by convulsive toxemia, of which there were 37, placenta previa 63, chronic nephritis, chronic endocarditis, pneumonia, etc., all of which had a mortality of their own, was 0.96 per cent. Excluding these complications, the maternal mortality was 0.47 per cent.

The fetal mortality has been estimated by various obstetric writers as varying from 10 to 30 per cent. in breech presentations. In the 3412 cases of breech presentation, 336 children at term were stillborn, a mortality of 9.4 per cent.; 442 were premature and would probably not have lived in any event. Of the mothers, 944 were primiparæ; 2468 multiparæ. As regards the fetus, among 944 primiparæ there were 198 still-births, while among 2468 multiparæ there were 560 still-births, a percentage of 21.6 per cent. and 22.7 per cent., respectively. The writer does not believe that breech presentation is an indication for Cesarean section without other complicating circumstances.

CESAREAN SECTION PRODUCED BY THE BURSTING OF A SHELL. Saint Porre² reports the case of a woman, aged 33 years, six months pregnant, who was seated at the window in one of the frontier towns in France under bombardment. A shell burst in the street below and a fragment struck the woman in the lower abdomen. At the hospital, examination showed that the projectile entered below and to the left of the umbilicus and passed out in the vicinity of the left crural arch. The epiploon could be seen at both orifices. The uterus was in anti-flexion. The position of the child could not be made out and auscultation was negative. On palpation, the abdominal muscle seemed to have been completely cut through. Operation was performed and an incision made in the median line below the umbilicus. A wound about 5 cm. long was seen at the fundus of the uterus extending from the median line downward and to the left. Through the wound the lumbar portion of the fetus could be seen with a small shell wound in that region. A median incision in the uterus was made and the fetus and placenta removed. As the writers believed that the fetus was dead they paid little attention to it, but while finishing the mother's operation, the cries of the child showed that it lived. It survived for 15 hours after the traumatism. The wound on the child was about 2.5 cm. long. The mother made an uninterrupted recovery and left the hospital well. Those who treated the case thought that the presence of the fetus prevented the perforation of the mother's intestine.

¹ American Journal of Obstetrics, 1916, lxxiv, 776.

² Progrès médical, 1916, p. 196.

Removal of the Uterus for Rupture. Purefoy¹ exhibited before the Section on Obstetrics of the Royal Academy of Medicine in Ireland, the body of the uterus removed by abdominal hysterectomy of a parturient woman shortly after rupture had occurred. The patient was a young woman, in her third pregnancy, having a history of difficulty in former labors because of a slightly contracted pelvis. Soon after admission a brow presentation was diagnosticated; this was converted into a vertex and the presenting part had nearly reached the outlet when symptoms of rupture of the uterus became manifest. On abdominal section, the fetal body and extremities came into view, having escaped through a large irregular rent involving the anterior vaginal fornix and lower uterine segment. In the presence of such important conditions, the immediate question to decide was whether to extract the fetus as rapidly as possible and then to repair the uterus, or whether it would not be better to remove it. In the present instance, removal of the uterus seemed the wiser course and it was performed as rapidly as possible.

In discussion, Tweedy said that he had witnessed the operation described and that such tears were always due to some previous tearing of the cervix, and he thought the most common cause for such an injury was the application of forceps before the os was fully dilated. When the cervix was torn, it was an easy matter to extend the rent, even though years had elapsed between the first and second rupture. He believed that better results were obtained by tamponing than by abdominal section, and that this method had the advantage of stopping bleeding and counteracting shock by preventing the prolapse of the intestinal contents and the entrance of air or microorganisms through the vagina. In tamponing, he usually takes a large piece of gauze in the hand. This should be pushed into the rent, but not through it.

Operations upon the Kidney for Tuberculosis during Pregnancy. Lindquist² had found, in his experience, that tuberculosis of the kidney not infrequently developed during the first few months of pregnancy. In 1 case nephrectomy during the third month was followed by recovery. A few months later, symptoms again developed pointing to the renal passages. The patient went through her pregnancy, but, after delivery, became worse, and death resulted about a year after the operation, probably caused by tuberculosis of the second kidney. In another case of longer standing, the patient gave birth to her third child and then the tubercular process became much more active. Two months later, nephrectomy resulted in a good recovery and 3 years after operation the patient remained well.

When tuberculosis of the kidney is limited to one kidney only, nephrectomy should be done as early as possible, even in pregnancy. The danger of the remaining kidney not being able to meet the requirements of pregnancy is slight, for, if it is sound, it will undergo compensatory hypertrophy and perform its normal function. After nephrectomy the patient must be watched carefully so that in case a latent tuberculosis of the remaining kidney becomes active, pregnancy may be immedi-

¹ British Medical Journal, December 9, 1916.

² Tr. Eleventh Norg. Surg. Cong., Goerteborg, July, 1916.

ately interrupted. Tuberculosis of the bladder is an indication for the interruption of pregnancy only if, after nephrectomy, it shows no tendency to improve or if it becomes aggravated. In bilateral tuberculosis of the kidney, pregnancy should be interrupted irrespective of the duration of the pregnancy except in cases where the delay of a few weeks may make the child viable.

A Suitable Incision for Approaching the Kidney. Obstetricians at times have occasion to approach the kidney for drainage in colon bacillus infection of the pelvis of the kidney. In *Surgery, Gynecology and Obstetrics*, January, 1917, in an article entitled "The Removal of Stones from the Kidney," Mayo illustrates and describes his methods. The incision begins from the twelfth rib at the outer border of the spine and extends downward and in a curved direction outward from the iliac crest. In operating upon pregnant patients to expose the kidney, one is sometimes handicapped because the uterus and its contents may have forced the kidney up beneath the ribs. In these cases it may be difficult to get close to the convex border of the kidney through which the incision should be made. In a case recently operated upon by the reviewer, it was impossible to suture the kidney to the wound, as, after a catgut stitch had been passed with the greatest care, the kidney substances were so soft that the stitch tore out.

THE PUERPERAL PERIOD.

Compression of the Aorta in Postpartum Hemorrhage.—Redmond¹ describes the case of a woman in her second labor whose first had been terminated three years previously with forceps under chloroform. When the patient was examined, it was found that the os was completely dilated and retracted, and the head about half-way through the brim. Pains were strong and frequent, but little, if any, progress was made during half an hour.

The patient was then given chloroform, and Simpson's long forceps was applied and a living child extracted with comparatively little difficulty. The uterus contracted well under manual pressure, but the placenta did not come away under pressure and a distinct pulsation in the cord indicated adherent placenta. The hand was introduced into the uterus and a portion of the placenta found adherent to the fundus. This was readily separated and the placenta brought away. The uterus was then compressed manually for 15 minutes until firm contraction resulted. Shortly after, however, the uterus relaxed and profuse hemorrhage occurred. After much hand massage, the womb again contracted. Ergotin was given hypodermically and the abdominal aorta was compressed against the lumbar vertex in the crutch formed by the flexed index and second fingers of the left hand, the arm being fully extended and the pressure made absolute by the tips of the two corresponding left fingers against the lumbar vertebrae close to the arch. The aortic pulse was feeble, irregular and intermittent, the patient was faint, the surface white and exsanguinated. Salt solution was given

¹ British Medical Journal, January 1, 1917.

into the alveolar tissues beneath the breast and the pressure was kept upon the aorta until the patient rallied. She recovered without bad symptoms and nursed her baby.

Compression of the aorta for postpartum hemorrhage has been resorted to in many cases with more or less success. When Momburg's bandage was brought to the attention of the profession, this was used in some cases to make firm and efficient pressure upon the aorta until the patient could be transported to the hospital. Its use was attended with great pain and distress, and sometimes with shock, so that it is rarely employed. There are several ways of compressing the aorta. One described by the writer of the paper quoted; another the application of the pad and bandage, and another by introducing the hand within the uterus, closing it to a fist and pressing with the knuckles against the large vessels at the brim of the pelvis. While these methods are all useful in an emergency, they cannot be continued long, but only sufficiently to give the hypodermic injection of drugs an opportunity to cause uterine contraction.

The Promotion of Lactation. Kettner¹ believes that woman should be carefully advised regarding lactation. At first she may take smaller and more frequent meals, but, after she is up and about, her ordinary methods of living may be resumed. She should take considerable exercise in the open air, and light sports and gardening are particularly beneficial. About 1½ quarts of fluid daily are requisite, including 1 quart of milk and the rest pure water. During warm weather water must be taken very freely, and should be given very freely to the child.

He draws attention to the importance of constipation after delivery, and believes that purgatives only increase the tendency. Purgatives attract the blood into the abdomen, drawing it away from the breasts where it is most needed. Active purgation checks or arrests completely the process going on in the mammary glands. So important does he consider this that he states that a dose of castor oil may turn the scale against the normal development of lactation. This is most likely to happen with the first child, and advantage is sometimes taken of this temporary interruption to stop the nursing of the child entirely. Should this happen with the first child, the mother is apt to assume as a matter of course with the next children, that she cannot nurse them. It must, however, be remembered that those children that nurse feebly are the ones who need such nourishment for the greatest length of time, and for this reason every effort should be made to promote lactation. The bowels can be moved by enemas.

Ernberg² states that when the mother does not yield enough milk in the first five days, this may be because the efferent passages are not fully permeable. The amount of milk is liable to lessen during the third or fourth week, probably because the mother is resuming her usual household tasks before she is quite strong enough. In all these cases the secretion of milk must be stimulated, and the natural stimulus is the sucking of the child. The oftener it sucks, the better the breasts respond,

¹ Med. Klinik, October 29, 1916.

² Hygiea, Stockholm, 1916, xxi.

but it must suck vigorously to be efficient. In these cases he advised letting a second child nurse at the same time, or at alternate times, with the mother's own infant. If possible, the mother and baby should go to a hospital or an asylum where other children are available. By this means he has restored lactation, even when it had been stopped for some time, having the breasts nursed eight or ten times a day. In 1 case lactation was restored in three weeks after the birth of the child; in another after four weeks of breast feeding and five weeks of bottle feeding. It took seven weeks for ample lactation. In other cases there had been no breast feeding until after six weeks of bottle feeding. The breast milk was finally brought up to 600 grams in four weeks; in another case to over 1000 grams in over nine weeks. He weighs the infant after each breast feeding, and, if it has not obtained sufficient, he gives enough of a bottle to make up the total. The mother sees that the child gets enough food and overanxiety concerning it is prevented.

Vaccine Treatment of Puerperal Fever. Jay¹ reports the case of a young primipara who had been seen before labor, as she had an erythematous rash without fever or other symptoms. This had almost gone when confinement occurred and there was no subsequent desquamation. The occiput turned posteriorly during labor, and there was a considerable tear when the child was born. The placenta did not come away promptly and part of it was retained. After labor, the patient suddenly complained of faintness, and collapsed. There was no marked external hemorrhage, the uterus was well contracted, but the patient was pale and restless, and respiration poor. Stimulants were administered for two hours without apparent effect. A large clot of blood was then expelled from the placenta. The patient was given a little chloroform and the rest of the placenta removed which was lying loose at the external os. The uterus was curetted and pituitrin was given. Saline fluid was injected by bowel and afterward into the axillæ, but these efforts to stimulate respiration seemed to be useless. The patient rallied in 12 hours and the temperature became normal. On the left buttock there was an angry blister about the size of a half-dollar and this seemed to have occasioned the rise in temperature. The temperature again rose and the perineal tear was sloughing. The uterus was again explored after cauterizing the perineal tear with carbolic acid. Nothing was found in the uterus. Antistreptococcic serum was given with good results, but the patient developed a cough, and the temperature again began to rise. The patient developed an urticarial serum rash ten days after the first injection and on the thirteenth day of her illness. The cough continued, but, on auscultation, one could find only slight diminution to the entrance of air and diminished resonance at the base of the right lung. The perineal tear was clean but there was still a discharge from the surface. The blister on the surface was still angry and painful.

When the urticaria disappeared and the morning temperature still remained high, a culture was taken through a speculum.

On the twentieth day of her illness the patient developed a third

¹ British Medical Journal, February 17, 1917.

rash which resembled measles, but which was doubtless septic. The patient became delirious and the laboratory reported that a few streptococci had been found in the material sent for examination. They accordingly sent a stock vaccine for injection. This was given with great benefit, the patient passing through a crisis and recovering. The sore on the buttock remained, but improved, and was soon entirely well after the use of the vaccine.

Fatal Rupture of the Bladder during the Puerperal Period. Huxley¹ reports the case of a primipara in whom the mechanism of labor was that of right occipitoposterior. The child was delivered by forceps, and the nurse was instructed to catheterize the patient. This was not done. A perineal tear was closed by suture.

On the ninth day, while the patient was still in bed and nursing her baby on the left arm, she made a sudden stretching movement of the right arm to pick up something from the floor. This was followed by violent abdominal pain, collapse and vomiting. The patient was immediately removed to the hospital, and, on admission, looked extremely ill, with great pallor, the tongue dry and bright red, the extremities cold and clammy, temperature 102.2° F., pulse feeble. The abdomen was greatly distended, symmetrical and moved on respiration. It was neither very rigid nor tender. There was dulness over the symphysis pubis and the presence of free fluid was recognized. The patient stated that she had passed no urine for about 30 hours. She was catheterized and 40 ounces of acid, somewhat offensive urine were withdrawn. On the following morning, 35 ounces of urine were obtained by catheterization. In spite of stimulant treatment, the patient's condition became gradually worse and she died ten days after delivery.

At autopsy, the odor of urine was noticed when the abdomen was opened and 2 or 3 pints of turbid urine and peritoneal exudate escaped. In the hypogastric region the bladder was adherent to the anterior abdominal wall, and the posterior part of its fundus adhered lightly throughout the anterior surface to the uterus. The whole bladder wall was very thin and the bladder obviously had been in a state of great distention. At the top of the bladder was a horizontal slit, 2½ inches in length, through which the urine had escaped. The edges of the slit were ragged and sharp but showed no sloughing. Signs of general peritonitis were present.

It would be interesting to determine, if possible, how this accident occurred. The writer believes that as forceps were applied to the fetal head when the bladder was distended, producing increased pressure on its walls, a condition of atony of the walls resulted, so that the state of distention was never overcome, the patient only partly emptying the bladder. The sudden movement which the patient made occurred at a time when the bladder was more than usually distended and the strong contraction of the abdominal muscle was sufficient to produce rupture.

But 1 similar case has been found in looking up literature. Gertles, in 1883, reports the case of an alcoholic multipara who suffered occasion-

¹ Journal of Obstetrics and Gynecology, British Empire, June-August, 1915.

ally from retention of urine. She had an abortion at 3 months after which acute abdominal symptoms developed from which she died 30 hours later. Rupture of the bladder was found to have caused death and was considered to have occurred as the result of strong labor pains acting on a distended bladder.

Puerperal Sepsis from Streptococcemia with Recovery. Knipe,¹ reports the case of a multipara, aged 34, whose previous history was good except that for one month previous to admission to the hospital she was in bed at her home, and had been sent to the hospital because of pain low in the abdomen on both sides and chills and fever. The ambulance surgeon arriving at the patient's home delivered her of a strong female child. The mother was brought to the Gouverneur Hospital and on admission her temperature was normal, pulse 106, blood-pressure 115. She was fairly well developed and nourished, but her face was very pale and anemic. Within 48 hours her temperature was 105°, pulse 144, and on either side of the pelvis were hard fibroid masses which were immovable, not particularly sensitive and which seemed to be a pelvic exudate. The lochia was normal in character and amount, the urine normal with the exception of some pus cells. The blood showed leukocytosis of 17,400. A blood culture was sterile at the end of 18 hours but after 48 hours a growth of *Streptococcus hemolyticus* appeared. A third blood culture was taken thirteen days after admission and showed no growth. A fourth culture, taken on the twenty-fourth day after admission, was sterile. The temperature ran a normal course in sepsis with decided chills lasting a half-hour, sometimes twice a day and sometimes one in two or three days. The patient's pulse varied from 90 to 144, but she still stated that she felt fairly well and complained only of chills and the sweat which followed. On the thirty-seventh day in the hospital, the patient's temperature became normal and remained so. On the fifty-third day she was discharged, with the uterus of normal size and position, the pelvic cellulitis had entirely disappeared on the right side of the pelvis but on the left there still remained a small amount of induration. The treatment had consisted in conserving the patient's natural resources, securing drainage by Fowler's position, forced liquid feeding, cold, fresh air in the room, ice-cap to the abdomen, enough vaginal douching to secure cleanliness and the use of urotropin and sodium benzoate for the pyelitis which was present.

Treatment of Puerperal Infection by the Intravenous Injection of Colloidal Metals. Willette² has had good results in this condition with intravenous injection of colloidal metals. He divided his cases into two groups first: One containing aerobic infections, generally by streptococci, which are most common and in which colloidal metals are useful; and, second, anaerobic infections and mixed infection amenable to oxidizing or mixed treatment. To secure good results, large doses must be used without fear of the reaction. Statistics show that by this treatment, in severe cases, the mortality is lessened, the duration is reduced and complications are less frequent. The action of the colloidal metals is

¹ American Journal of Obstetrics, August, 1916.

² Jour. de méd. de Paris, August, 1916.

explained by the rapid modification of conditions in the kidneys and the general circulation of the metals with their peculiar physical properties.

The fall in temperature, followed by leukocytosis, improvement of the general condition and increase in the amount of urine, indicate a crisis or a series of slight crises preceding a greater one. The use of this treatment does not prevent or interfere with other treatment.

Sarcoma of the Ovary Complicating the Puerperal Period. Brodhead¹ described the case of a negress, 18 years old, delivered normally of a living child, with moderate hemorrhage and no ulceration. On the two following days the condition was good. On the third day, the patient had pain and tenderness in the abdomen, with moderate disturbance of pulse, and the temperature was elevated. The abdomen was soft and slightly tender. There was marked tenderness and rigidity in the epigastric and umbilical portion of the right inguinal and lumbar regions. Leukocytes were 17,000, and on the seventh day the temperature rose to 103° F., pulse 130, tenderness and rigidity increased. Vaginal examination showed some tenderness in the fornices. For the next seven days, until the day of operation, the temperature varied between 101° and 103° and after operation it remained normal. A mass could be palpated in the right lower quadrant, tender, elastic and slightly movable. The diagnosis of abdominal tumor was made. On section, a sarcoma of the right ovary, bluish in color, with greatly dilated veins, was found. This was removed, and the patient made an uninterrupted recovery. On microscopic examination, the tumor proved to be a spindle-cell sarcoma.

Lactation Complicated by the Presence of Tubercle Bacilli in Breast Milk. Wang² found, in 65 specimens of breast milk taken from 5 tuberculous mothers, tubercle bacilli recognized by smears and by the antiformalin method. In these cases there was no apparent mammary disease or suspicion of such. In 1 patient disease of the mammary gland was found to be present, and in 1 there was a suspicion of it. These cases had negative sputum which was ascertained by repeated examination for over eight months. There were no symptoms of active pulmonary disease, and tuberculous bone lesions, which the patient had, progressed favorably. The specimens from the various patients were taken at all periods of mammary activity; in 1 case eighty-eight days before delivery and at various periods after delivery. The cases where actual tuberculous disease could be recognized were of the common type: one moderately advanced; one far advanced but uncomplicated; one far advanced and complicated with tuberculous laryngitis; and one non-active pulmonary case complicated with active tuberculous bone lesions.

Dental Disease in Nursing Women. Waller³ believes that it would be a great help to pregnant women if the mouth could be thoroughly examined and adequately treated and dental disease reduced to the lowest possible percentage. One result of such treatment would be the very marked improvement in the woman's general health which would

¹ American Journal of Obstetrics, July, 1916.

² Bulletin of Department of Public Charities, New York City, 1916.

³ Lancet, 1916, exci, 785.

influence lactation, and, following this, the rate of gain in the child's weight would be accelerated and also the length of time over which nursing could be carried out. In 200 cases studied by the writer in which data could be obtained, there was improvement in 80 per cent.

The Condition of the Blood of Mother and Child at the Time of Birth. Slemmons and Morriss¹ found, in 35 normal obstetric patients at the time of birth, that the average rest nitrogen in the maternal blood was 25.2 mg. for 100 c.c. In the fetal blood, the average was 24.9 mg. In 16 normal patients the average quantity of urea nitrogen in the maternal blood was 10.5 mg. for 100 c.c., and in the fetal blood the average was 10.4 mg. The urea nitrogen represents 44 per cent. of the rest nitrogen in the maternal blood and 45 per cent. in the fetal blood. This concentration of urea in both circulations indicates that these substances passed through the placenta by diffusion. Complications, accompanied by increase of urea in the maternal blood such as toxemia, syphilis, decompensating heart lesions and others, are attended with a corresponding increase in the fetal blood urea. Thus pathological cases confirm the conclusion that urea diffuses through the placenta. If a patient during pregnancy is given chloroform, alterations occur first in the fetal and later in the maternal blood. The fetal blood urea is increased. Prolonged anesthesia causes a moderate increase in the rest nitrogen of both circulations. Asphyxia, caused by impairment of the fetal heart action, is attended by a notable increase of the fetal urea in the blood. In cases of stillbirth the increase in the urea in the fetal blood generally represents 60 to 85 per cent. of the total rest nitrogen.

Abderhalden Reaction in Mental Diseases. Cotton, White and Stevenson² have used the Abderhalden test in 289 cases, including the various derangements of the mind and also in some normal individuals. From this investigation they obtained the most interesting results in cases of dementia precox and epilepsy. In dementia precox, out of 58 cases, 46 gave positive reaction, or 81 per cent.; and in 9 cases the reaction was negative. In all cases blood counts were made, but wide deviations from the normal were noted in dementia precox. The lymphocytes were usually in a larger percentage than the polymorphonuclear leukocytes. In smears, the lymphocytes were 56 per cent. and the polymorphonuclear leukocytes 38 per cent. In the eosinophiles there was a marked increase, sometimes reaching 6 per cent. The total number of leukocytes was low, in one case 2100 per c.c. and average about 6500. In other psychoses there was practically normal blood count and with this a slight increase in pulse-rate with low blood-pressure and sub-normal temperature. It is interesting to note that in dementia precox, 75 per cent. die of tuberculosis. The next highest percentage of tubercular deaths is in general paralysis in which 16 per cent. die of tuberculosis. The acute cases, in which death occurs in from 3 to 5 years, practically all die of tuberculosis. In 69 cases of epilepsy, all were positive to the suprarenal gland.

¹ Bulletin of Johns Hopkins Hospital, xxvii, No. 310.

² Journal of Nervous and Mental Diseases, February, 1917, xlv, No. 2.

The Placenta as a Galactagogue. Bianchini¹ describes 5 cases in which the placenta was eaten. The after-birth was consumed to increase the secretion of milk, which, in all of the women who took it, had failed without apparent reason after previous confinements. The placenta was cut up and washed and cooked in the same way, except that in one case in which a broth was used for the purpose, and eaten in large pieces. Except for the cooking, the method of administration was practically that which is seen in animals, as the bitch which swallows its own placenta immediately after its expulsion.

It is said that this treatment was successful after other methods of stimulating the secretion of milk had failed. In antiquity and the Middle Ages, difficult labor was treated by the administration of placenta, and at present the human placenta and that of the sow have been used in extract administered in pill form and in other vehicles to increase the activity of the mammary glands. Throughout the world there is the belief that the placenta has a marked influence over the function of reproduction. Thus, in Morocco, it is believed that the placenta will cure sterility and hasten delivery. In China, preparations of the placenta are administered for this purpose and also in the treatment of anemia following childbirth. It is considered to be best when taken fresh, but is also used in the dried form and made into pills.

French midwives have stated, in books upon parturition, that the eating of the placenta would produce a free secretion of milk, and one of them writes from her own experience that sheep's placenta, dried and triturated with powdered sugar, is the best preparation for this purpose. In the French Congress of Internal Medicine in 1898, a communication was presented on the therapeutic action of placenta illustrated by more than 100 cases. Sheep's placenta in tablets, which represent 0.25 gr. of the fresh substance, was used and the daily dose exceeded 1.5 grams. This had an excellent effect upon the secretion of milk. So, too, in chronic metritis with subinvolution and catarrh, even when the tubes and ovaries were diseased, and in cases of abnormal involution of the uterus after delivery, the administration of the placenta was highly beneficial.

The Retention of the Placenta Treated by Gabaston's Hydraulic Method. D. von Bassewitz² uses, in place of the Credé expression or other manual method, Gabaston's method of filling up the placenta with saline which he injects through the umbilical cord. This produces distention of the placenta and stimulates uterine contractions, while the fluid within the uterus and accumulated behind the placenta aids in producing its separation and expulsion. This was called the hydraulic method, and may bring about the desired results in a few moments. In the first of von Bassewitz's 2 cases the uterus had absolutely failed to contract, but when the saline fluid was introduced into the placenta from a douche can 1.5 meters above the level of the patient's bed, it began to contract vigorously when 800 c.c. had thus been injected, and the

¹ Gazz. ital. delle Levatrici, July, 1916.

² Journal Brazil-Medico, Rio de Janeiro, January 20, 1917, xxxi, No. 3.

placenta was spontaneously expelled within 15 minutes. In the second case several quarts of fluid were injected but without apparent effect, and the placenta was removed by the gloved hand, the uterus having been drawn out to the vulva when the patient was delivered. This abnormal low position of the uterus after delivery accounted for the fact that the injection of fluid into the placenta did not stimulate uterine contractions. When the placenta is entirely retained within the uterus from inertia, or when the placenta is abnormally adherent to the wall of the uterus, this method will give prompt results. When the case is not one of partial lateral separation of the placenta, there may be no apparent result. Should the placenta be over the tube at its orifice into the uterus, this method of treatment might prove dangerous, as the fluid injected might pass through the tube and enter the abdominal cavity.

The Puerperal Period Complicated by Hydatid Mole and Chorio-epithelioma. Caturani¹ reviews the recent literature of this subject and reproduces illustrations, and makes some practical deductions. He finds that oftentimes one cannot foretell the course of a patient who has had an hydatid mole, because it is difficult to obtain the positive evidences that the wall of the uterus has been really invaded. If we could appreciate the extent to which the uterine wall is invaded and the character of the lesions which attack it, we could make a more definite prognosis. Furthermore, in these cases the uterus is softened and friable from the presence of the mole, and curetting is but partially successful in completely removing the results of the impregnation. Even if the operation be repeated at short intervals, one cannot be sure that all of the remnants have been removed. Anterior hysterotomy, done through the vagina, seems to be the most simple and efficient means of thoroughly emptying the uterus in these cases. At this time a small section of uterine tissue might be obtained for examination. Vaginal metastases in an hydatid mole are not always benign, even though we recognize the fact that in normal pregnancy villi may be carried to various parts of the body without injury. In an hydatid mole the chorio-epithelioma has an exaggerated ability for proliferation. If this metastasis be neglected and the patient be kept under observation, there will often be a fatal issue. The presence of the core of the villus in suspicious cases cannot suffice to exclude the possibility of malignant disease, especially if vacuolate plasmodium be present and Langhan's cells are present in large numbers. These should be considered almost pathognomonic of malignancy when they are found in curetting at unusual times.

While one cannot agree to the identification of hydatid mole as chorio-epithelioma, it is evident that from a mole a malignant growth is apt to develop. The real evidences of malignancy can only be obtained by a close investigation. The so-called invasive mole seems to be a transition development toward the growth of chorio-epithelioma. Most of these are really transitional forms and should be termed chorio-

¹ American Journal of Obstetrics, April, 1917.

adenomamalignum. In the diagnosis of chorio-epithelioma, the core of the villus is not to be considered as a factor of exclusion. These growths are now divided into two types—syncytium and chorio-epithelioma, and this division is borne out by the clinical observations and also by the study of the specimens.

THE NEWBORN.

Lumbar Puncture of the Fetus during Extraction in the Interest of Fetal Life. Casta¹ states that during a severe labor, pressure upon the head causes the fluid to pass into the vertebral cavities, thus permitting some reduction in the size of the cranium. With this in mind, it occurred to him that in difficult podalic extraction it might be well to practice lumbar puncture on the fetus during delivery. He finds no difficulty in performing the operation and as soon as the breech appears externally, a medium-sized needle is introduced between the 4th and 5th lumbar vertebræ. No fluid is withdrawn immediately, but it escapes spontaneously when the fetal head is compressed into the pelvic cavity. This practice can be extended to any case in which there is especial difficulty in extracting the head on account of partial dilatation or resistance of the cervix. Experience will show its practical value.

Predetermination of Sex. Siegel² has compiled data showing a connection between the condition of ripening in the ovum at the time of conception and the sex of the embryo. His records of 300 pregnancies seem to illustrate this point. He would divide the periods of conception into four—from the 1st to the 9th day after menstruation; from the 10th to the 14th; from the 15th to the 22d. The remaining time before the returning of menstruation shows so few conceptions that it is omitted. In the last series he confirms his previous conclusions, namely, that a female child may be expected when the ovum is young, from the 15th to the 23d day; a male child is more probable when the ovum is overripe, that is, from the 27th day after the onset of menstruation to the 9th day following the onset of the next menstruation. During the periods between these, the chances are about even for a male or female child. One of his tables embraces 115 cases. In the 1st to the 9th day period there were 48 boys and 14 girls; 15th to 23d inclusive, 5 boys and 26 girls; 24th to 26th, no boys and no girls; 27th to onset of the next period, 4 boys and no girls.

Pyrll has a somewhat similar series of 25 cases, his observations coinciding with Siegel's.

Treatment of Collapse and Cyanosis in Newborn. Göppert³ draws attention to the fact that healthy babies during the first week of life sometimes have attacks of collapse with cyanosis. The child gasps for breath, there is no cough, and the symptoms suggest, except for the lack of cough, bronchitis or bronchopneumonia. Acute septic infection will sometimes produce a similar picture. Before fixing on the

¹ *Gaz. d. osp. e delle clin.*, 1916, xxxvii, 1109.

² *München. med. Wchnschr.*, December 19, 1916.

³ *Therap. Monatsh.*, December, 1916.

diagnosis of pneumonia or sepsis, the writer would give the child 100 to 150 gm. of tea to drink. If the trouble is depending entirely upon the lack of water, the child is well within an hour. In young breast-fed babies, the balance of water is very unstable, and if the child does not take the breast well for one night or one day, it may bring about such a lack in the normal fluid balance that severe disturbances with cyanosis and collapse follow. If the condition can be promptly recognized and corrected, the child's life may be saved.

Pregnancy and Munition Work. In a recent paper on the effect of work in munition factories on pregnancy and maternity, Bonnaire¹ gives the results of his observation in 31 mothers who worked in munition factories during pregnancy. Their children were slightly less in weight than the average for that year born in the same maternity. Work in munition factories need not be harmful to pregnant women if their hours are not too long, and strict supervision is exercised over the mothers. The work is of a purely mechanical nature, and in some respects is easier than domestic work which pregnant women are accustomed to do. When heavy machinery is in motion at high speed, there may be considerable vibration and sometimes shock, and this would be injurious to pregnant women. During the last month of pregnancy, women should not work in munition factories. There should be a doctor or a skilled midwife attached to all factories where pregnant women are employed.

The Influence of Alcohol upon the Child before Birth. Ballantyne² divides the effect of alcohol upon the unborn into three stages—the fetal period of some 7 months, the embryonic extending back to 6 to 8 weeks after impregnation, and the germinal period when the germ cells exist on the reproductive organs of the parents. In the latter period the germinal cells are exposed to the blood and nervous system influences which affect the other portions of the body, although the Graafian follicles may protect to some extent. In the embryonic period protection is afforded by the decidua, and in the fetal by the placenta. Nicloux found alcohol in the cord, placenta, and blood of a child whose mother had received rum and milk an hour before delivery. Others have observed that female rabbits given alcohol were less productive than those that had none. In ascertaining the effect of alcohol on the human subject, it is very hard to separate the effect during pregnancy from that before pregnancy. During the fetal period it certainly causes premature labor, miscarriage, stillbirth, and hemorrhage during labor.

The effect of alcohol during the embryonic period has been studied by experiments upon hens' eggs. The growth of the impregnated egg was inhibited and monstrosities were produced by the injection of alcohol into the albumen of the egg. As the embryonic period in mammalian is only five or six weeks, and as the protective effect of the decidua is considerable, it is hard to prove this in mammals, but there is abundant clinical observation which indicates that alcohol is injurious.

In the germinal period the effect of alcohol can be noted by clinical

¹ British Medical Journal, February 24, 1917.

² Medical Press and Circular, 1916, cii, 377.

observation. Bezzola, in studying 9000 Swiss idiots, in 1900, found that two acute annual maximum periods corresponded to the periods of carnival and vintage when the people drank most. Stillbirths have been found to occur frequently under the same circumstances. When animals were experimented upon, alcohol was given by inhalations to guinea-pigs for six days a week for several years. In the offspring of these the effects could be traced through the 1st, 2d, 3d and 4th generations, the deformities produced grew worse during the later generations. The conclusion was reached that alcohol damaged the chromatin of the germ cells. There is abundant reason to believe that alcohol injures the unborn child.

Cholesterol in the Blood of Mother and Fetus. Slemons and Curtis¹ called attention to the significance of lipid bodies in the blood of mother and child, and, by studying cholesterol, which is one of these substances, they find that this is transported through the placenta and that possibly the increase of this substance in the mother's blood arises from its passage from the fetus. It is significant that anesthesia considerably influences the quantity present. In normal cases delivered without anesthetic, the difference between the total cholesterol in the maternal and fetal blood may be accounted for by the quantity of cholesterol bodies in the former. So far as free cholesterol is concerned, the quantity is practically the same in both circulations. The placental partition permits the passage of free cholesterol, but not of cholesterol bodies. The practical application of the amount of cholesterol in the blood is made in the clinical study of cases of auto-intoxication.

Gastro-intestinal Hemorrhage in the Newborn. Triollet² believes that in the treatment of gastro-intestinal hemorrhages of the newborn the risks of using epinephrin more than counterbalances the possible advantages. Calcium chloride has given good results at the Tarnier Maternity when administered by the mouth, while, at the same time, gelatinized serum was given by subcutaneous injections. The combination of these substances is especially valuable, as neither alone does so well. In these cases the child is given a teaspoonful of 2 per cent. solution of calcium chloride every two hours until the total amount in 24 hours is from 1 to 2 grams. This treatment is continued for a day or two after all signs of hemorrhage have disappeared. Twenty c.c. of the gelatinized serum is given daily in the scapular region by subcutaneous injections. The child is absolutely cut off from food, and only a few teaspoonfuls of boiled water every two hours are allowed, alternating with the medication and to lessen thirst. Hot-water bottles are used to keep the child warm. The mother's nursing is resumed very cautiously after hemorrhages have absolutely ceased. If there be a suspicion of syphilis, specific treatment is also given. In preparing the gelatinized serum, it must be sterilized at 120° C. for half an hour.

Umbilical Polyp. Tarbox³ calls attention to umbilical polyp as a remnant of the vitelline duct. The umbilical stump commonly drops

¹ American Journal of Obstetrics, April, 1917.

² Arch. mens. d'obst. et de gynéc., 1916, pp. 285-376.

³ Journal of the American Medical Association, March 31, 1917.

off on the 5th or 7th day after birth, and the remaining surface closed over. When umbilical polyp develops, the region of the umbilicus remains bright red, with a granular appearance after the separation of the stump: This surface bleeds easily and resists local treatment, and a painless, bleeding condition persists indefinitely. Where there is persistent weeping from the cord stump in the newborn, it is often due to a patent vitelline duct.

When this surface is examined by the microscope, it is found to be composed of mucous membrane of the intestine, with villi, glands of Lieberkühn, and other elements normally found in the intestine. The presence of intestinal mucous membrane is explained by the fact that in the early embryo this duct communicates with the digestive tract. The spherical yolk-sac at the beginning of embryonic life communicates with the intestine by a wide opening. This gradually contracts, remaining connected with the intestine by a narrow portion known as the vitelline duct. The yolk-sac finally joins the placenta and the vitelline duct can be traced through the entire length of the umbilical cord. That part of the duct lying between the intestine and the umbilicus usually undergoes degeneration and disappears. Occasionally, it does not, but retains its lumen and connects the intestine with the umbilicus. Such a polyp may be closed or patulous. If the latter, fecal contents escape, and a probe can be passed from the fistula into the bowel. Obviously, the amount of discharge will depend on the caliber and tortuous condition of the duct. Where the opening is concealed in the umbilical depression, it may be difficult to trace it, and where the opening is large, the intestine may prolapse.

The case reported was that of a girl, aged 12 years, with a negative family and medical history, who was brought for treatment because there was a small growth at the umbilicus which oozed and bled so freely that it stained the patient's underclothes and soiled her dresses. Her mother said that the cord had never healed from birth. There was no pain, and the lesion did not increase in size. There had been no fecal odor or discoloration on the dressing. The amount of bleeding had increased lately.

On examination, at the umbilicus there was a circular, bright red, granular-looking surface, somewhat elevated above the surrounding skin. There was no evidence of hernia or weakness of the rectus muscle nor could a probe find communication from the external surface. Tests for syphilis and tuberculosis were negative.

The condition was treated by elliptical incision around the umbilicus. The polyp, with the surrounding tissue, was dissected down to the sheath of the rectus muscle, here the constriction was about 2 mm. wide. On cutting across, a patulous duct was found, and a probe passed 5.5 cm. into the abdominal cavity. As the abdominal wall was firm, no effort was made to follow the duct farther. The duct was ligated and the stump touched with the actual cautery and buried beneath the rectus sheath. The patient made a good recovery and the parents were informed concerning the possibility of intestinal obstruction.

On microscopic examination, the polyp was covered externally by a

mucous membrane resembling that of the small intestine. In this could be distinguished villi and other intestinal elements. Beneath this was connective tissue, with smooth muscle fiber and dilated blood-vessels.

As there is a possibility that the polyp may be attached to a Meckel's diverticulum, it would be well, if possible, to follow the duct to the intestine, and, should a diverticulum be found, to tie it off at the intestinal junction.

The Limits of Bleeding Considered from the Clinical Stand-point. Bernheim¹ draws attention to the value of blood transfusion in anemia, and states that it is impossible to have a specific rule for the application of this method of treatment. He gives the instance of a boy, whom he once transfused, whose hemoglobin was too low to register on any of the instruments used for this purpose. In another instance the hemoglobin registered 40 at the time of operation, but the patient was in a most critical condition from hemorrhage from gastric ulcer. A rapidly falling blood-pressure is always a valuable warning, and likewise the classic signs of blood loss. When hemorrhage is severe, it is a good rule to transfuse if the blood-pressure falls as low as 70 mm. of mercury. If no appreciable result occurs within an hour, the case is usually hopeless unless new blood can be given and delay at this time is exceedingly dangerous. A case of placenta previa is described where the patient was semiconscious, with shallow breathing and pressure about 70. It was thought that the patient was improving and so delay was practised for half an hour before transfusion was undertaken. The patient suddenly failed and died before the operation could be completed. One cannot always rely upon the blood picture, for occasionally, with the red cells over 2,000,000 and the hemoglobin over 50 per cent., the condition may be a very serious one. The only drug of direct value in hemorrhage is morphine carefully given. Digitalis and strophanthin may support a weak heart for a short time, but the effect is very temporary. Strychnine, nitroglycerin, and atropine have not, in the hands of the writer, been especially valuable. In cases of hemorrhage complicating parturition, ergot and pituitrin are of doubtful value.

The writer has seen the best results with women from giving $\frac{1}{4}$ grain of morphine as soon as hemorrhage begins, and if the drug is given later, the dose should be smaller. Measures should then be taken to stop the bleeding, if possible. The body should be kept warm, the foot of the bed elevated, the limbs bandaged, and as much water given as the patient will take. If the patient craves other foods, such may be given by mouth, by rectum, subcutaneously, or into a vein. In the experience of the writer, coffee, tea, water, salt solution, ice, have all been used to advantage. There is great danger, in the excessive use of salt solution, that hemorrhage may be encouraged rather than prevented. On one occasion a patient who had had salt solution very freely did not improve, and it was thought best to undertake direct transfusion, but when incision was made no blood flowed from the patient but salt solu-

¹ American Journal of the Medical Sciences, April, 1917.

tion very freely. This patient was greatly benefited by the direct transfusion of blood.

Attention is called to the fact that in the newborn the occurrence of hemorrhage should lead to prompt transfusion. The newborn infant resists blood loss poorly, and gains with corresponding rapidity when blood is introduced.

The writer has had excellent results in the subcutaneous injection of sterile horse serum in cases of hemorrhage where there had been no wound of a vessel. These cases were usually of a toxemic nature, some of them in the toxemia of early pregnancy. The dose has been 20 c.c. repeated in accordance with the indications. In the case of infants suffering from intestinal hemorrhage, repeated irrigation of the bowel with salt solution, leaving some of the fluid for absorption, has given good results.

Anesthesia and Eugenics. During the year past interest has been excited by the claims of those who state that with nitrous oxide and oxygen anesthesia the obstetrician has a perfectly safe and exceedingly efficient way of lessening pain. It has been claimed that this can be administered by a nurse or by an inexperienced person, and that as long as 6 hours can be occupied in manipulation without intermitting the anesthesia.

The claims for nitrous oxide-oxygen anesthesia have been well set forth in a small book entitled "Painless Childbirth, Eutocia and Nitrous Oxide-Oxygen Analgesia." The writer is Carl Henry Davis, Associate in Obstetrics and Gynecology in the Rush Medical College and one of the Staff of the Presbyterian Hospital of Chicago. A short history is first given of anesthetics and their use in labor, and the merits and dangers of each is fully discussed. The best method of administration for nitrous oxide and oxygen is fully described. The results obtained are contrasted with the results observed in a group delivered under average normal conditions, and it was found that labor was shortened 25 per cent. by the administration of anesthesia. No harm for mother or child was observed when it is used. When properly administered, the cost was comparatively slight, and apparently a safe and successful method of securing analgesia had been obtained. The patients were asked to pay for the gases used, and it is claimed that their stay in the hospital was shortened sufficiently to save enough to pay for the analgesia. Lacerations were rendered somewhat less extensive, there was no predisposition to postpartum hemorrhage, and usually the labor could be carried through without having recourse to ether or chloroform. It is claimed for this method that it can be used successfully for version or forceps, and that, if combined with novocaine infiltration, Cesarean section can be done under its influence. There are many points of interest concerning the technic of administration, and, evidently, to use this method efficiently and safely, thorough training and experience are necessary.

It is thought advisable that rectal examination be substituted for vaginal examination in labor. What this has to do with the method of analgesia is not evident, but the statement is made in the book

under consideration. The fetal heart sounds should be followed and at the moment of expulsion the patient should not become anesthetized, because she will then lose her self-control and struggle as with ether. This seems to us an extraordinary statement, because, if ether is given, the patient loses consciousness completely for a few moments as the head passed over the perineum but does not struggle, and the delivery is accomplished without suffering for the mother.

It is stated that if the child should become cyanotic, the mother may be given pure oxygen as long as the cord pulsates and the oxygen then administered to the child. Some member of the family may be taught to administer nitrous oxide and oxygen for cases of spontaneous labor. Complete anesthesia, it is stated, is difficult, and should be undertaken only by an expert. There is also the possibility that the patient may administer nitrous oxide and oxygen to herself, although it is stated that precipitate labor may sometimes result. It is thought that when the anesthetizer has not had large experience, a little ether should be used. The ideal anesthetic for Cesarean section is said to be nitrous oxide-oxygen, with local infiltration of the skin, fascia, and peritoneum with 1 to 1000 novocaine. Pituitrin is injected into the uterine wall and the uterus is not removed from the abdomen when it is opened. To cheapen the method and reduce the cost, rebreathing is sometimes employed. If this be continued, however, the results are not pleasant. When the element of pain is considerable in labor, morphine, heroin, or chloral hydrate are often given. It is thought necessary to give the gases very rapidly to secure an effect. When the uterus is irritable and uterine contractions are violent, the gas should be given continuously, and, if this does not suffice, anesthesia may be used during uterine contractions. When the very practical consideration of cost is taken into account, in an ordinary obstetrical case, the cost of nitrous oxide and oxygen varies from 50 cents to \$1.00 per hour. Statements are made as to the best machine to be employed and the best ways of using it.

While nitrous oxide and oxygen anesthesia is a useful adjunct to obstetric practice, the claims for it have not as yet been proven in the experience of the majority of the profession. For surgical anesthesia, it is a dangerous substance to employ, and even for analgesia its use requires knowledge, experience and training. The reviewer has used it for very brief anesthesia to introduce bougies for the induction of labor or for dilatation of the uterus with a bag to interrupt an early pregnancy, but he has seen it fail in the use of forceps and version and in cases where relaxation of the uterus was indispensable.

Eugenics and Birth Control. Possibly from economic considerations caused by the awful waste of life in the European war, the subjects of eugenics and birth control and obstetrics, the whole comprised in the broad general term of obstetrics, have received unusual attention, not only from the profession but from the laity as well. Efforts are made to instruct young persons in the facts concerning reproduction and to bring about a better state of marriage and thus the birth of better children. With the hope of diffusing useful knowledge and making

marriage more successful, various popular books have been designed for circulation.

If such books as this can do little, if any, good, what could do better? The reviewer has had some experience in teaching this subject not only to medical students and nurses but also to the pupils of schools. He found, in the last instance, that a plain, simple, accurate statement of the essential facts in human reproduction excites respectful interest in the minds of boys and girls and does nothing but good, but the line must be held very strictly to limit statements absolutely to facts and without discussion of any kind. Illustrations from other kindred phenomena in nature are always potent, but these increase the clearness and accuracy of the general truths. It is a pity that in so important a matter, the truth, the whole truth and nothing but the truth, cannot be given unbiased and unobscured.

During the winter past there have been frequent discussions before medical societies and in the press concerning what is termed "Birth Control." The use of this phrase is a familiar example of the employment of language to conceal ideas. Birth is controlled by anesthesia, the use of forceps or certain manipulations which physicians commonly practice in attending cases of labor. What is meant by the phrase "Birth Control" is the prevention or limitation of conception which is a very different matter. Here, too, agencies affecting the community come forward and use their claims to dictate. One is the Law which cites statutes against the performance of criminal abortion, and the other some branches of the Church which advance theological dogmas to govern the usages of patients in matters concerning pregnancy and parturition. While the matter has not been brought to a conclusion, there are certain grounds which seem rational, and which we believe the profession should accept and support. Obstetricians and the medical profession generally recognize that there are conditions where conception is a calamity for the mother, the unborn child, the community and the nation. Such, for example, are cases in which one or both parents are tuberculous, syphilitic, drunken, imbecile, criminal or degenerate. There are also cases in which the poverty of the parents is such that the mother and child cannot be properly nourished, but these cases can almost invariably be relieved considerably and cared for. There are also instances in which a woman has borne several children in dangerous and difficult labor, and in which, as she approaches the latter half of her life, she believes it to be just that she be protected from further conception. If the husband shares this view, and husband and wife request it, sterilization of the woman by surgical means is, we believe, justifiable.

Strictly speaking then, the term "Birth Control" applies to the prevention and limitation of conception. Who shall decide when this is right and proper and what means shall be employed. Obviously, this duty falls upon the medical profession and upon no one else. The scope of modern medicine now embraces much relating to economics, for the physician is the only one who can justly and accurately estimate the damage done to a nation by bad economy. We believe that the

profession should interest itself more and more in economic questions, and that the public should recognize the profession as one of its most valuable advisors upon these points. As the profession increases its scope of public service and gains in influence with the public, it will show itself the proper source for advice and decision upon the question of the prevention or limitation of conception.

In the confused mind of the public, interruption of pregnancy is thought of as "Birth Control." Here, again, the same factors which confuse the issue in the prevention or limitation of conception seek to assert their authority to decide upon these points. Again the medical profession is the proper tribunal for the decision to interrupt pregnancy properly and wisely, or to refuse so to do. No better check could be given to criminal abortion than to publish widely the conditions under which this may properly and rightly be done, with the penalties which follow the commission of the crime of criminal abortion.

No more wretched travesty upon science could be instituted than so-called clinics conducted by the laity to control conception, or in the interest of so-called "Birth Control." Nothing but harm can come from an hysterical and ignorant appeal to the fears and desires of unfortunate women oppressed by poverty or distressed by sin. It is hoped that this outbreak of hysteria may die a merited and natural death.

There is throughout the profession, and in the mind of the public at large, an increasing interest in the welfare of the nation as regards the protection and care of the health of children. Prenatal clinics conducted at responsible hospitals by competent medical persons, coöperation by social service to remedy economic failure, the enactment of laws controlling the hours and conditions of work for women, and their general interest in the welfare of the country, with the diffusion of sound knowledge, must work together for great good. Among its many other duties, the medical profession at present is called upon to do its utmost for this end.

DISEASES OF THE NERVOUS SYSTEM.

BY WILLIAM G. SPILLER, M.D.

BÁRÁNY TESTS IN BRAIN LESIONS. In order to understand the significance of these tests it is necessary to have some knowledge of the anatomy of the tracts from the semicircular canals through the brain, and this has been concisely stated by Isaac H. Jones.¹ We must recognize that corrections may have to be made in the following statements from the results of further study:

1. The fibers from the horizontal semicircular canal pass through the eighth nerve, enter the brain stem at the junction of the medulla oblongata and pons, and continue directly to Deiters's nucleus and there divide into two pathways: (a) The vestibulo-ocular tract, concerned in the production of the nystagmus. These fibers go from Deiters's nucleus to the posterior longitudinal bundle through which they pass to the various eye-muscle nuclei, from which, through the third, fourth and sixth nerves, they are distributed to the eye muscles themselves. (b) The vestibulo-cerebello-cerebral tract, responsible for the vertigo. From Deiters's nucleus this path enters the cerebellum through the inferior cerebellar peduncle to the three vestibular cerebellar nuclei of the same side, from which it proceeds upward through the superior cerebellar peduncle and continues to the cerebral cortex on both sides, but more particularly the opposite side.

2. The fibers from the vertical semicircular canals have a very different course; after passing through the eighth nerve they immediately ascend into the pons and at a point above the middle of the pons they have a division into two pathways similar to the division of the horizontal canal fibers at Deiters's nucleus: (a) The vestibulo-ocular tract, the fibers entering the posterior longitudinal bundle. (b) The vestibulo-cerebello-cerebral tract reaches the cerebellum through the middle cerebellar peduncle, entering the cerebellar nuclei of the same side, from which the pathway is identical to that of the fibers from the horizontal canal, through the superior cerebellar peduncle to the cerebral cortex of both sides.

Bearing these anatomical facts in mind we are able to appreciate the clinical findings as given by Lewis Fisher.

Fisher² states that his experience, derived from clinical and pathological findings, justifies him in asserting that spontaneous vertical nystagmus upward is a pathognomonic symptom of a lesion of the brain stem. He gives a summary of symptoms obtained by the Bárány tests which are worthy of record.

¹ Pennsylvania Medical Journal, December, 1916, p. 174.

² Ibid., p. 175.

When stimulation of the ear by the various methods employed produces no nystagmus, no vertigo, no past pointing and no falling, a destruction of the labyrinth or eighth nerve may be diagnosed, and complete deafness on the same side confirms this diagnosis.

If stimulation of the horizontal semicircular canals produces no nystagmus, but normal vertigo, normal past pointing, the lesion is in the medulla oblongata, between Deiters's nucleus and the posterior longitudinal bundle.

If stimulation of the vertical semicircular canals produces no nystagmus, but normal vertigo, normal past pointing and normal falling, the lesion is in the posterior portion of the pons near the posterior longitudinal bundle.

If stimulation of the horizontal semicircular canals gives normal nystagmus, but no vertigo and no past pointing, the lesion is in the inferior cerebellar peduncle on the same side or at a point farther along the vestibulo-cerebello-cerebral tract.

If stimulation of the vertical semicircular canals causes normal nystagmus, but no vertigo, no past pointing, and no falling, the lesion is in the middle cerebellar peduncle, or at some higher portion of the vestibulo-cerebello-cerebral tract.

If stimulation of the horizontal and vertical semicircular canals produces no nystagmus, but normal vertigo, normal past pointing, and normal falling, the lesion is in the posterior longitudinal bundle.

If stimulation of the horizontal and vertical semicircular canals produces normal nystagmus, but no past pointing, no falling, and no vertigo, the lesion is in the cerebellar nuclei of that side where the fibers from the inferior and middle cerebellar peduncles come together, or in the upper portion of the pons where all these fibers again come together at the decussation of these fibers in the superior cerebellar peduncles.

According to Mills and Jones,¹ vertigo is always caused by disorder of the vestibular apparatus. No matter where the primary seat of the affection which causes vertigo may be situated, whether in the stomach, kidney, liver, pancreas, tonsils, or the brain outside of the vestibular apparatus, the resulting toxemia, the abnormal nervous stimulus, or the cardiovascular disorder does not produce vertigo until the vestibular apparatus—the labyrinth and its associated pathways and the encephalic centers—is involved. The Bárány tests furnish the means for studying this apparatus, and there seems to be truth in the assertion that they enable us to determine more positively with the assistance of other evidence whether the lesion be situated in the third ventricle, the cerebello-pontine angle, the pons, medulla oblongata, or cerebellum.

Some reference to the Bárány tests may be made as they are not generally known, even at this late date. The semicircular canals may be stimulated by turning an individual in a revolving chair, or by douching the ear with either hot or cold water. When the individual is turned with the head in the upright position, the horizontal canals are stimulated.

¹ Journal of the American Medical Association, October 28, 1916, p. 1298.

When he is turned with the head forward or backward, the vertical canals are stimulated. Both labyrinths are implicated by the turning, whereas only one is affected by douching. Douching the ear with the head upright stimulates the vertical canals, whereas douching with the head forward or backward stimulates the horizontal canal.

The authors report an interesting case in which Jones, from the Bárány tests, made a diagnosis of a lesion of the upper portion of the pons at the junction with the cerebral peduncles, and the necropsy showed a glioma of this region. Turning the patient to the left produced a deviation of both eyes to the left, persisting some little time. This conjugate deviation is regarded by the writers as the slow component of nystagmus. It occurs from the passing of stimuli from the ear through the posterior longitudinal bundle to a nuclei of the external rectus. This conjugate deviation of the eyes is usually converted into nystagmus by impulses from the cerebrum which tend to call the eye back to its usual position, provided the cerebro-oculo-nuclear tracts be open. If the response is only a conjugate deviation, some lesion interferes with the transmission of cerebral stimuli to the nuclei of the ocular nerves affected.

The authors believe the ear stimulus which produces vertigo passes to the cerebrum through the cerebellum, through the inferior cerebellar peduncle from the horizontal canals and the middle cerebellar peduncle from the vertical canals, and after completing its cerebellar itinerary, passes to the cerebrum by way of the superior cerebellar peduncles. In the case they report, ear stimulation failed to produce normal vertigo from all the semicircular canals except the left verticals. As there was present a conjugate deviation from the stimulation of the same canals, the lower neuraxial pathways were open. The lesion seemed therefore to be at the decussation of the superior cerebellar peduncles.

Cases studied in this way by the Bárány tests and by findings at the necropsy afford much promise for extension of our diagnostic ability.

ANEURYSM OF THE INTERNAL CAROTID ARTERY. The symptom-complex of tumor at the base of the frontal lobe is one to which Kennedy¹ has referred previously. It consists of a true retrobulbar neuritis, with the formation of a central scotoma and primary optic atrophy on the side of the lesion together (if pressure be sufficiently great) with ipsilateral anosmia and papilledema in the opposite eye. Kennedy reports an obscure case, so far as symptoms were concerned, in which an enlarging central scotoma of one eye was followed, after six months, by a similar condition in the other eye. There was no loss of smell, but on the side of the body opposite to that in which the eye was first affected, slight signs of pyramidal tract implication were seen. The symptoms in this case hardly seem sufficient for an accurate diagnosis. An aneurysm of the right internal carotid artery was found at the necropsy.

POSITION OF HEAD IN CEREBELLAR TUMORS. It has been a subject of more or less dispute whether the position of the head is of value in diagnosing a tumor in one or the other cerebellar hemisphere. In 58

¹ Journal of the American Medical Association, November 4, 1916, p. 1361.

certified cases of cerebellar and extracerebellar tumors studied by Grey,¹ an unusual attitude of the head, tilted so that the ear approximated one shoulder or both, was found in 23. In the majority of these, the change in position was slight. Of 43 certified cases of tumors lying anterior to the cerebellum, only 3 showed any tilt or rotation of the head. The unusual attitude in these 3 cases was scarcely noticeable. About 40 per cent. of the cases with cerebellar tumor thus showed some change in the position of the head, while only about 7 per cent. of the cases with tumors anterior to the cerebellum showed any unusual attitude.

Grey thinks his cases show that a tilt or rotation of the head in a patient with symptoms pointing toward an intracranial tumor is suggestive of a subtentorial tumor. Such an attitude has no additional significance in localizing the lesion in one or the other side of the posterior cranial fossa.

Backward rotation of the head was a feature in 8 of 60 cases of cerebellar and extracerebellar tumor. Typical opisthotonos attacks appeared in 2 of these. No similar position was noted in cases with tumors lying anterior to the cerebellum. Backward retraction of the head is thus characteristic of tumors situated below the tentorium.

Of 59 certified cases of cerebellar and extracerebellar tumor, some form of occipital discomfort was present in 44, about 75 per cent. Tenderness in the subocciput was found in 21, or 36 per cent. Suboccipital headache or pain was complained of in 33, or 56 per cent. There was more or less soreness or stiffness of the neck muscles in 18, nearly 31 per cent.

No consistent relation was found between the part of the posterior cranial fossa occupied by the tumor and the site of the discomfort. When unilateral suboccipital discomfort is present, it is slightly suggestive of the side of the tumor.

Suboccipital discomfort is present more than twice as often in patients with subtentorial tumor as in those with tumors situated elsewhere in the brain; and though it affords only slight assistance in localizing the lesion in one or the other side of the posterior cranial fossa, it nevertheless ranks with asynergy (limb ataxia, staggering gait, etc.) as an important indication of a subtentorial tumor.

VARIETIES OF BRAIN TUMORS. The study by F. B. Clarke² of 99 tumors in my laboratory is of importance as showing especially the varieties and locations of brain tumor. Gliomata numbered 38; endotheliomata, hemangioperitheliomata, and peritheliomata, 37; metastatic carcinomata, 7; gummata, 6; tuberculomata, 5; sarcomata, 4; gliosarcoma, 1; blood cyst, 1. While males predominated in these statistics, it does not follow necessarily that they are more liable to tumor than females. This paper is largely a pathological study, and deals with the peculiar features of glioma, endothelioma, etc. It is one that should be of great interest to those concerned with neuropathology.

Cortical Visual Representation. Determination of cortical representation of vision from injury of the brain, without operation or necropsy,

¹ *Annals of Surgery*, 1916, p. 129.

² *Review of Neurology and Psychiatry*, November, 1916, p. 485.

must be regarded with some doubt, because one can never be sure that the lesion is sharply defined. Softening, hemorrhage or some other condition may alter the brain at an area more remote than the area primarily affected. Gordon Holmes's¹ conclusions, based on observations made on wounded soldiers, cannot, as he himself says, be regarded as final. They are as follows:

1. The upper half of each retina is represented in the dorsal, and the lower in the ventral part of each visual area.

2. The center for macular or central vision lies in the posterior extremities of the visual areas, probably on the margins and the lateral surfaces of the occipital poles.

3. That portion of each upper quadrant of the retina in the immediate neighborhood of, and including the adjacent part of, the fovea centralis is represented in the upper and posterior part of the visual area in the hemisphere of the same side, and *vice versa*.

4. The center for vision subserved by the periphery of the retinae is probably situated in the anterior end of the visual area, and the serial concentric zones of the retina from the macula to the periphery are probably represented in this order from behind forward in the visual area.

Perception of Movement without Perception of Form. Injuries of the occipital lobe may cause disturbance of form or color in the visual fields, one defect without the other, but it is not so well known that from a cortical lesion coarse or even fine movements may be detected before fingers presented to the so-called blind field may be recognized or counted. George Riddoch² states that Wilfred Harris has described transient hemianopsia in which movement was perceived before form or color, but Riddoch asserts that movement as a definite visual perception has not been recognized nor have the fields been charted systematically.

In examining war cases of injury to the occipital lobes he has been impressed by the frequency with which movement could be detected in the affected field before a stationary object was seen. He believes from his observations that movement should be recognized as a definite visual perception, that it may be dissociated from vision for stationary objects apparently completely or partially; and that, as vision returns, perception of movement recovers before the object can be seen.

His method of testing was as follows: As the slide or the disk on the pointer was approached from the periphery, as soon as the patient said he saw something moving, the chart on the screen was marked. If the square 1 cm. white disk was not distinguished at the same point, the slide on the disk was brought nearer the fixation point till it could be clearly seen, when a record was again made on the screen or chart. The patients had difficulty in describing what the "something moving" was like, it was so vague, but they were sure it had neither shape nor color, and that it could be seen in a field entirely blind to stationary objects.

¹ Brain, parts 1 and 2, xxxix, 34.

² Proceedings of the Royal Society of Medicine, Section of Neurology, November 23, 1916.

Riddoch makes the interesting assertion that vision is a form of general perception and a wider conception of what vision is might be obtained if it were considered not as a special sense, but as a part of general sensation.

The visual apparatus belongs to the afferent sensory system, and conveys sensory impressions. Sensory activities are governed by certain laws, and interference with the visual paths should give rise to results comparable to what obtains when other sensory mechanisms are disorganized. It should be possible to compare defects of vision and of sensation from lesions at corresponding physiological levels. A few of the visual defects which resemble disturbances of sensation are:

1. Dissociations of primary visual perceptions of light, movement, stationary objects, form and color.

2. Inability to localize an object seen and to estimate its length.

3. Inability to appreciate "difference"—relative length and distances.

4. Inability to distinguish between a flat dish and a sphere.

5. Irregularity of response to stimuli. This apparent untrustworthiness of the patient has been described by Head and Holmes as being a typical feature of cortical disturbances of sensation.

Preservation of Macular Vision with Loss of Panoramic Vision. This condition is certainly very rare. The case reported by Holloway and Spiller¹ was as follows: A man had three attacks of vertigo associated with unconsciousness, following the third attack the vision was unimpaired until two weeks later, when the patient suddenly became blind while reading a newspaper. After the second day there was a gradual return of vision, but no improvement has been observed during the past three years. Until a year ago he had used whisky in excess. Both disks showed a decided greenish-white atrophy. The fields showed a marked contraction, being essentially macular fields, *i. e.*, the form fields were contracted to almost 5 degrees all about fixation, with retention of the blue, red and green fields. The distant vision of each eye was 6/6.

The case is very much like one reported by Byron Bramwell. The alcohol may have affected the optic nerves deprived largely of function, and led to the atrophy. This preservation of acute vision for the small macular area with loss of vision in the surrounding field is very striking.

Hemiplegia.—CONDITION OF THE SOFT PALATE AND TONGUE IN HEMIPLEGIA. In all hemiplegics, according to Long and Weisenburg,² in whom there is an involvement of the lower part of the face, there is also weakness of the soft palate. This can be seen with the mouth open, with the palate at rest and in phonation. When at rest the arch of the palate on the affected side is flatter and broader than that on the normal side. In phonation the soft palate on the paralyzed side appears to give way and the arch of the palate goes back and toward the normal side.

In hemiplegics in whom the lower part of the face is involved, the tongue on the paralyzed side loses its elasticity, and is flabby to touch and pressure. When lying in its cavity, the posterior part especially

¹ Journal of Nervous and Mental Disease, March, 1917, p. 249.

² Journal of the American Medical Association, November 18, 1916, p. 1516.

appears to be thicker and not as wide in comparison to the normal side, this being especially brought out when the tongue is protruded.

HEMIPLEGIA IN DIPHThERIA. Any form of hemiplegia is uncommon in diphtheria, but the transient form, according to Rolleston,¹ has occurred only in a case reported by Leede and in 3 observed by himself. Two of these cases Rolleston now reports: In one, the hemiplegia lasted apparently less than twenty-four hours, and followed convulsions. Death occurred, but no necropsy was obtained. The report sounds like the paralysis of exhaustion following convulsions. The second case was very similar. The absence in the first case of any cardiac disturbance negatives the suggestion of embolism, while the thick cloud of albumin, high blood-pressure, headache, vomiting and convulsions are typical of uremia. Uremia in diphtheria, Rolleston states, is extremely rare. In his second case the early involvement of the heart, characteristic of the malignant cases of diphtheria, was similar to that he had noted in his other cases of diphtheritic hemiplegia. Cardiac thrombosis, giving rise to cerebral embolism, seemed to be present, but unlike the other cases on record, the emboli probably were small and the lesions easily reparable.

Aphasia. We now know that the simple dictum of right-handed people having the speech centers in the left cerebral hemisphere, and left-handed people having these centers in the right cerebral hemisphere, is not acceptable. A very interesting paper by Foster Kennedy² emphasizes this statement. In this the author quotes cases in which right-sided cortical lesions in left-handed persons did not produce any form of aphasia, and other cases in which right-sided lesions in right-handed persons did produce aphasic disturbance. As he says, the simple statement that a given person is right-handed or left-handed is not adequate, and it is not only by investigating the question of a patient's handiness but also that of the prevailing type of handiness in his family that we shall be able to throw light on the peculiar manifestations of aphasia.

Infantile Form of Diffuse Sclerosis of the Brain. Very little is known of this peculiar diffuse overgrowth of the neuroglia in the brain of young children. Knud Krabbe,³ of Copenhagen, has made the best study of it and gives an excellent description.

A characteristic feature is the acute onset at the age of four to six months in children who, until this age, had been healthy. Only in one case was the child extraordinarily stiff all the time, but there may be a mistake in regard to this case. Causeless fits of crying and screaming have been observed as prodromal symptoms. Among the typical symptoms is the universal rigidity of the musculature of the body and limbs, most pronounced in the lower limbs. A further stage of this rigidity is shown by the universal tonic spasms, which appear to be evoked by such stimuli as noise, light, or touching.

The usual posture during the attacks is with the head drawn backward, the back curved in opisthotonos, the upper extremities flexed

¹ Review of Neurology and Psychiatry, April, 1916, p. 145.

² American Journal of the Medical Sciences, December, 1916, p. 849.

³ Brain, parts 1 and 2, xxxix, 74.

at the elbow-joints, the hands either clenched or in the obstetrical position, the lower extremities extended at the hips, knee- and ankle-joints, and often adducted until they cross. Nystagmus has occurred in all cases, especially during the fits.

In addition to the attacks of tonic spasms, which seem to be a higher stage of the permanent rigidity, regular tonic convulsions occur in some cases though not very frequently. True paretic symptoms are not manifested until toward the end of the disease, when the spastic condition gradually passes into a relaxed paralytic state.

It has been impossible to make any observations regarding sensation, nor has ataxia been determined. In 3 cases optic nerve atrophy has been observed, and in 1 case optic neuritis. Optic atrophy seems to be a characteristic sign, at least in the latest stages of the disease. Mental faculties do not develop after the disease begins.

Periodic elevations of temperature are difficult to explain. They may be caused by some occult infection or intoxication, and be merely an accidental complication, but they may represent a characteristic feature of the disease.

The most characteristic features, as far as the pathology is concerned, are the complete destruction of the axis-cylinders and medullary sheaths, the replacement of the destroyed tissue by neuroglia, and the relative intactness of the nerve cells. The regular distribution of glia without any deformity of the brain is best explained by the steady substitution of glia in places where the nervous tissue has been destroyed. Krabbe regards the disease as a degenerative process having a perivascular origin, but does not feel entirely sure of the correctness of this view. The disease has a tendency to appear in families, and does not seem to be syphilitic. Krabbe's conclusions are:

The so-called diffuse sclerosis of the brain in children may be divided into at least three distinct types: (1) A syphilitic form; (2) Schilder's encephalitis periaxialis diffusa; (3) a familial infantile form, of which he describes 5 cases and refers to one other in the literature.

1. This form shows the following characteristics: It is usually a familial disease; it sets in somewhat acutely in about the fifth month in a child who until then has been healthy; it progresses in a chronic course, ending with death five or six months after the onset; universal rigidity of the musculature, violent tonic spasms, probably causing pain, and brought on by touching or noise, form characteristic symptoms. As a rule, nystagmus is present, and in the later stages atrophy of the optic nerve. Periodic elevations of temperature occur, without perceptible cause, outside the central nervous system. Finally, extensive paresis and pronounced debility close the scene.

2. The pathologico-anatomical findings are: A marked hardness of the white substance of the brain without alteration of its shape. Microscopic examination of these cases showed relative intactness of cortex and the basal ganglia, the nervous centers of the brain and of the spinal cord; destruction of the medullary sheaths and axis-cylinders throughout the white substance of the cerebrum (a 2 mm. layer is preserved immediately under the cortex). Complete destruction of the white matter

of the cerebellum and degeneration of the spinal nerve tracts are present. The destroyed tissue is replaced by dense fibrillar glia, in which are seen a considerable number of variously shaped glia cells, mostly protoplasmic; the vessel sheaths are infiltrated with fatty granule cells and other apparently gliogenous scavenger cells. There is total want of new formation of vessels or infiltration of the vessel sheaths with plasma cells, lymphocytes, or leukocytes.

3. The affection must be regarded as a purely degenerative and not as an inflammatory process. The disease presents a certain relationship to Pelizaeus-Merzbacher's disease, aplasia axialis extracorticalis congenita, on one side, and to Tay-Sachs's form of familial amaurotic idiocy, on the other side. In other respects it differs conspicuously from both these groups.

Progressive Lenticular Degeneration. This peculiar disorder described by Wilson, and sometimes known as Wilson's disease, may appear in an acute or subacute form, lasting from a few months to a year; and a chronic form extending over a period of several years. The subject has recently been discussed by Pfeiffer,¹ who reports a case with careful microscopic study.

As Pfeiffer states, the differentiation between the acute and chronic types is distinguished by the rapid emaciation and high, irregular fever in the acute form, whereas the patient in the chronic form may appear to be in relatively fair health for a year or more before the progressive features of the disease are manifested.

The disease resembles paralysis agitans, but differs from it in its occurrence early in life and in its more rapid progress. The most prominent and characteristic symptoms are disturbances of motor function, especially in tremor and muscular rigidity. Tremor is always present but differs in intensity, and may be slight and limited to the distal parts of the limbs in the onset of the disease, but in the later stages it may implicate the whole body. Rigidity is one of the most important symptoms.

In Pfeiffer's case, microscopic alterations were found in the cerebral cortex as well as in the lenticular nuclei, but he is unable to give and satisfactory explanation as to the cause of the disease.

Bullets in the Brain. It is well to bear in mind that a bullet in the brain may change its position by gravity within a short time, and that an x-ray photograph should not be depended upon to determine the position of the bullet for operation, unless it has been made shortly before the operation is to be done. This fact is well emphasized in 2 cases reported by Vilvandré and Morgan.² These writers state that the alteration probably occurs because of the damaged brain matter, and is more likely to occur the heavier the metal. A patient with a bullet in the brain probably will lie in one position for days at a time. In both their cases the wound of entrance was through the frontal bone, and in both the "drift" movement of the foreign body was toward the occipital

¹ Journal of Nervous and Mental Disease, April, 1917.

² Archives of Radiology and Electrotherapy, 1916, No. 191.

region. The distance that a bullet may travel in the brain within ten days or two weeks is considerable.

Injuries of Nervous System from Bursting of Shells without External Wound. Among those who have written on this subject are Pitres and Marchand.¹ They have observed the symptoms of meningitis, paresis, cerebellar lesions, multiple sclerosis and tabes in soldiers, following the bursting of a shell, even though no injury on the surface of the body was demonstrable. The symptoms may point to a focal lesion or to lesions scattered through the brain and cord. Loss of consciousness usually has occurred at once and has lasted for hours or days, and has been followed by amnesia. Careful examination usually has shown that the clinical picture is imperfect. The lesion has been supposed by some to be hemorrhage in the pia or in the nervous tissues, by others a concussion of the nervous tissue, and by still others the formation of air bubbles in the vessels by a change of the atmospheric pressure like that occurring in caisson disease. As organic conditions from this cause may be associated with functional disturbances, it often is difficult to separate the one form from the other.

Meningitis. INFLUENZAL MENINGITIS. Torrey² thinks cerebrospinal meningitis caused by the influenzal bacillus is not infrequent and probably occurs without recognition, as there is nothing in the symptomatology to distinguish it from meningitis due to other acute infections. The only means of diagnosis is a careful bacteriological examination of the spinal fluid. There have been collected, by Wollstein and Simon, 61 cases of pure infection by the influenzal bacillus and 9 of mixed infection, with only 5 recoveries. Torrey has collected the reports of 26 additional cases, with 2 recoveries. He reports 2 cases, 1 with recovery.

Wollstein prepared a serum by immunizing a goat by means of virulent strains of the influenzal bacillus, and with this serum she was able to control successfully experimental influenzal meningitis in monkeys. The disease was rapidly and invariably fatal in untreated animals, but complete recovery without complications was obtained by the intradural injection of serum. Torrey employed the anti-influenzal serum in his case and recovery resulted. He believed temporary improvement followed the use of antimeningococcic serum, which was employed before the culture reports showed the nature of the infection. This may have been partially due to the removal of spinal fluid, or to the effect of the serum, or may have been independent of either. Following the use of anti-influenzal serum, the improvement was very striking for two days. Simple lumbar puncture and drainage were substituted for the serum treatment, on account of the severity of the pain following the introduction of the serum. Had improvement not been satisfactory under this procedure, serum would again have been used, possibly with a previous introduction of novocain.

The spinal fluid was withdrawn slowly until marked discomfort was

¹ *Revue Neurologique*, November and December, 1916, p. 298.

² *American Journal of the Medical Sciences*, September, 1916, p. 403.

caused by temporal headache. The pressure was measured by a glass tube of small caliber connected with the needle. It was noticed at each tapping the pressure could be reduced about one-half before uncomfortable symptoms developed.

A review of the cases which have recovered Torrey believes emphasizes the value of lumbar puncture as a therapeutic measure in meningitis, and experimental results indicate that in the anti-influenzal serum there is available a specific agent which should be employed in meningitis due to the influenzal bacillus. This serum was obtained from the Rockefeller Institute.

CIRCUMSCRIBED CYSTIC SPINAL MENINGITIS. The occurrence of another case of cyst of the spinal pia causing symptoms of compression of the cord, with successful operation, is reported by Hanes and Willis.¹ At the operation, when the spinal dura was opened, a cyst the size of a cherry, translucent, and with a delicate wall, presented in the incision. This cyst was incised, with the escape of clear, colorless fluid, and it then collapsed. The cord seemed flattened and somewhat compressed by the cyst. The improvement in the condition of the patient was immediate and remarkable. On the day following the operation he could move the legs with considerable certainty, and on the tenth day he was able to stand for a moment or two alone.

The explanation of cystic meningitis given by these authors is that, as the result of either septic or aseptic inflammatory processes, the leptomeninges form adhesions which may produce single or multiple cysts. The histological structure of the trabeculated pia-arachnoid would seem to favor such a process. They acknowledge the possibility of trauma as a cause, and believe that by the production of small hemorrhagic effusions into the leptomeninges, toxic inflammation is produced, with consequent adhesions. The walls of these cysts are so delicate that if the cyst should be punctured in opening the dura, one can readily understand that the condition might not be recognized. This possibility was very evident to me in the case reported by Musser, Martin and myself, and is mentioned by Hanes and Willis. The latter writers conclude that from some of the descriptions published, where "upon opening the dura a large quantity of fluid escaped under pressure," it seems probable that a cyst was opened when the dura was incised.

I fully agree with these authors when they state that the symptoms of circumscribed serous meningitis are those of cord tumor, and that it is doubtful whether a differential clinical diagnosis can be made between extramedullary tumors of the cord and cyst of the pia-arachnoid.

Hanes and Willis obtained, by lumbar puncture in their case, a fluid with a distinct yellowish tinge, a cell count of three lymphocytes to the cubic millimeter, and marked excess of protein material by the Noguchi globulin reaction; findings which indicated obstruction in the circulation of cerebrospinal fluid, and made meningomyelitis, gumma or parenchymatous cord lesions improbable.

¹ American Journal of the Medical Sciences, December, 1916, p. 859.

Radiculitis. The work of Dejerine¹ and his associates has firmly established the existence of radiculitis. By this term Dejerine means sensory or sensorimotor symptoms characterized by their root distribution and caused by inflammation of the nerve roots in their intrameningeal course. So far back as 1896, he reported, with Thomas, a case of the lower type of brachial plexus palsy of the Klumpke type with muscular atrophy and disturbances of sensation in the distribution of the eighth cervical and first thoracic roots, with severe pain. At the necropsy, a limited syphilitic patch was found, measuring 5 by 3 millimeters, surrounding and compressing the anterior and posterior left eighth cervical roots and the anterior left first thoracic root. These roots were much atrophied, and no other lesions of the meninges or cord existed. Dejerine has come to believe that many cases of sciatica are of root origin, as motor symptoms usually are absent in sciatica, and he has found the radicular topography in many cases, and lumbar puncture has revealed a lymphocytosis indicating a meningeal origin of the sciatica, usually syphilitic in character. He has never observed a purely motor radiculitis of other than cranial nerves.

Radiculitis does not cause pain increased by movement or pressure of muscular masses and nerve trunks. The tender points of Valleix and the sign of Lasègue (pain from overstretching of the sciatic nerve) may be absent in sciatica, because the lesion is not trunkal, but radicular, but a trunkal sciatica may be associated with a radicular sciatica. Movements which cause traction on the roots may be painful in radiculitis, as in sciatica the rotation inward of the thigh flexed on the pelvis (sign of Bonnet) which pulls upon the plexus; or in the upper limb the dropping of the shoulder. Exceedingly characteristic of radiculitis is the increased pain on coughing or sneezing. Paresthesias occur often in radiculitis, and Dejerine, with others, has observed that in acroparesthesia the symptoms are radicular in topography, and he believes that acroparesthesia often is caused by chronic radiculitis.

The tendon reflexes usually are affected in the distribution of the affected roots; they may be exaggerated but only in the onset of the radiculitis; they usually are abolished, but often are inverted, *i. e.*, the desired reflex is not obtained but the irritation is transmitted to other reflex centers.

Radiculitis may develop within a few hours, a few days, or insidiously, and when developing slowly is usually less painful. The purely sensory form is usually milder than the sensorimotor form, but there may be exceptions to this rule. The purely sensory form is more common in the lower limbs and the sensorimotor in the upper limbs. The lumbosacral radiculitis is the most common form of all. It may be confined to the fifth lumbar, first and second sacral roots, and thus confined to the distribution of the sciatic nerve, but very often the process extends beyond this area or implicates only a part of it, and possibly a part of the adjoining area. When motor palsy occurs, it may not be in exactly the same distribution as the sensory disturbance.

¹ *Revue Neurologique*, March, 1916, p. 321.

Radiculitis may be unilateral in the lower limb, or may extend from one lower limb to the other in the course of several months or several years, or may be bilateral from the beginning. When bilateral, either in the upper or lower limbs, it is seldom symmetrical, it usually predominates in one limb and may affect different roots in the two limbs, so that in this way a mark of distinction is obtained from polyneuritis or compression of the cord. In rare instances roots at a considerable distance from one another may give the signs of radiculitis. Syphilis and tuberculosis are the most common causes of radiculitis. Dejerine attributes 80 per cent. of his cases to syphilis, and the symptoms may develop any time after the infection; from five months to ten, twenty, or thirty years, and in the majority of cases a lymphocytosis may be detected by spinal puncture. The syphilitic radiculitis may be acute or chronic.

The tuberculous radiculitis certainly is the most common next to the syphilitic. Neuralgia, and especially sciatica, are common in the tuberculous. The frequency of lymphocytosis of the spinal fluid in tuberculous radiculitis has not been determined, but, from the cases studied by Tinel, lymphocytosis is inconstant.

Opportunity is seldom given for a necropsy in radiculitis and only 2 cases with necropsy seem to be recorded in the literature. It may be associated with tabes or meningomyelitis and is by no means always isolated. It may result from a lesion of the pia about the cord or from a lesion where the posterior root enters the spinal ganglion and is surrounded by a meningeal sheath.

Prognosis depends upon the character of the radiculitis. In acute syphilitic forms, recovery is the rule after treatment; but treatment usually fails in chronic cases, although chronic cases are not hopeless. Some of the symptoms may disappear, even if all do not. When syphilis is not the cause of the radiculitis, or when it is the cause but antisiphilitic treatment has not been successful, Dejerine has found epidural injections excellent in lumbosacral radiculitis. Lumbar puncture alone or with intraspinal injection of novocain or stovain has produced objectionable symptoms disproportional to the therapeutic effects. Epidural injection of 5 to 10 c.c. of physiological serum with novocain in the dose of 0.5 to 1 in 100, as in the following, are recommended by Dejerine.

Distilled water	100 gm.
Novocain	0 gr. 50
Sodium chloride	9 gm.

The novocain quiets the pain immediately but after some hours or some days the pain may reappear, and then 5 or 6 c.c. of the following solution may be injected epidurally.

Distilled water	100 gm.
Sodium chloride	9 "
Novocain	1 "
Carbolic acid	0 gr. 50

This injection, notwithstanding the novocain, produces pain, but the pain diminishes considerably after a few days and, if necessary, the injection may be repeated several times. X-ray treatment also is of service. At levels above the lumbosacral region the epidural injections are difficult and the x-ray treatment is to be preferred. Resection of posterior roots is to be reserved for chronic and serious cases.

Syphilis. Ball¹ points out that a definite relationship between the activity of the syphilitic processes and the Wassermann reaction, as well as the other reactions in the blood and spinal fluid, does not always exist. Late syphilis, bone syphilis, tabes and cerebrospinal syphilis, with extensive involvement and active symptoms, may give negative reactions, while strong positive reactions occur in persons who are apparently in good health. A case of paresis, in a complete remission, may give as strongly positive Wassermann reaction, or as much of an increase of the lymphocytes in the spinal fluid as an active and rapidly progressive one. Some cases after a mild treatment may lose their positive reactions, only to have them return after a short interval; or a negative case may become positive after treatment. Ball refers to one of his cases in which a positive serum Wassermann, after the administration of salvarsan intravenously, became negative and remained so, although the clinical condition gradually became worse and the patient died. In another case, a positive reaction persisted in spite of vigorous treatment, although all symptoms disappeared.

Ball has found the Wassermann often absent both in blood and spinal fluid in nervous syphilis and has come to depend a great deal on the globulin and lymphocyte reactions of the spinal fluid, especially on the latter. The disease in which it occurs with a symptomatology that might be mistaken for syphilis are not numerous. As even a slight increase in the number of lymphocytes is important, the spinal fluid must be absolutely free from blood, as the faintest trace of this will give a positive Nonne and a lymphocytosis.

A syphilitic person may have latent syphilis of his nervous system until some exciting cause transforms the latent process into an active one. In one of Ball's cases a cerebrospinal syphilis developed several weeks after a severe head injury. The patient was apparently well before his accident, but soon afterward he complained of severe headache and became mentally dull. He developed also a hemiparesis on the right side. The spinal fluid gave an increased globulin and lymphocyte reaction. These symptoms entirely disappeared under specific treatment. It is presumable that the injury so lessened the normal tissue resistance that the latent process was converted into an active one.

Ball believes that all syphilitic patients before they are discharged from further treatment ought to have an examination of the spinal fluid. In the absence of other symptoms, this examination forms the best means of deciding when it is safe to stop treatment. In tabes and paresis, it may be impossible to obtain a normal spinal fluid with present methods of therapy.

¹ Journal of the American Medical Association, January 27, 1917, p. 262.

FAMILY SYPHILIS. The study of the different members of a family when one of the members has signs that are obscure will, in some instances, reveal the syphilitic origin of the disorder. As Stoll¹ states, in late hereditary syphilis the patient may present no sign of syphilis and but a single obscure symptom which may be so distressing that a more or less complete invalidism results. Suspicious symptoms and possibly conclusive physical signs may be found in other members of the family. Stoll reports the case of an unmarried woman, 26 years of age, who had had severe headache since earliest childhood. At the age of 15 she was compelled to leave school on account of the headaches, and she consulted prominent European physicians, without relief. The Wassermann test was repeatedly negative. Her father had died of tabes. Injections of mercuric salicylate gave marked relief from symptoms. Similar cases are reported by him.

This subject is an important one, for many syphilitic cases in which obscure symptoms occur are escaping detection.

SYPHILITIC SPONDYLITIS. B. Sachs² does not regard syphilitic spondylitis as a relatively rare disease, and in this opinion he differs from Nonne, Oppenheim, and Lewandowski. It is difficult to distinguish between tuberculous and syphilitic caries of the vertebræ by Röntgen-ray examination. In the syphilitic form there is never any real crushing of the bone, and the changes are always much more on the periphery than in the center of the vertebræ. Sachs accepts the point of view of Jachés, who, in addition to these Röntgen-ray findings, depends on the examination of the blood and spinal fluid and the rapid improvement following specific treatment. This form of spondylitis Sachs has seen in association with tabes in a few instances. He believes that few cases of spondylitis are of rheumatic origin, but he is not willing to discard wholly the group of rheumatoid spondylitis. The differential diagnosis between spinal neoplasm and spondylitis is not always easy. In primary neoplasm the Röntgen plates do not show disease of the vertebræ, but a spondylitis may be found in the vicinity of a spinal neoplasm. The more rapid development of symptoms indicates tumor. The difficulty in diagnosis is especially great in secondary carcinomatous and sarcomatous deposits in the vertebræ, but in these conditions the more rapid progress of the symptoms and the early involvement of the spinal cord and relatively slight involvement of the vertebræ will indicate neoplasm rather than spondylitis.

SYPHILITIC OPHTHALMOPLÉGIA INTERNA. It is an interesting observation that Grossman³ reports, *viz.*, the occurrence of 4 cases of familial ophthalmoplegia interna from congenital syphilis. The father had hemiplegia of gradual onset, and the Wassermann of his spinal fluid was 4+. The mother had had three miscarriages followed by the birth of 4 children. Her vision was failing, her pupils were irregular, almost rigid to light, and reacted sluggishly in accommodation. Her blood Wassermann was 4+. Three of the 4 children had pupils widely

¹ Journal of the American Medical Association, December 23, 1916, p. 1885.

² American Journal of the Medical Sciences, November, 1916, p. 661.

³ Journal of the American Medical Association, March 31, 1917, p. 963.

dilated, unequal in size, irregular in outline, and not reacting to light, in accommodation, convergence or the instillation of physostigmine salicylate. The other child, in addition to these pupillary disturbances, had nystagmus, bilateral Babinski reflex, bilateral persistent ankle clonus, and spastic gait. The blood Wassermann was 4+ in one child, doubtful in two, and negative in the fourth, although one of these children later seems to have developed a positive Wassermann reaction.

The author describes his cases as an example of the selective action of spirochetes, and it is singular that all 4 children showed the rarest form of pupillary disturbance found in congenital or acquired syphilis of the nervous system. A rigid pupil is not so common as the Argyll-Robertson pupil. The cases strengthen the view that distinct strains of the spirochete exist.

TREATMENT OF SYPHILIS. At the Clifton Springs Sanitarium, Nicholson¹ has treated nervous syphilis by *salvarsan* and *mercury* injected together into the spinal column. Fifty c.c. of salvarsanized blood was obtained from the patient by the Swift-Ellis method. The clot was separated, and the serum centrifugalized and allowed to remain in the ice-box overnight. The following morning the serum was pipetted from the clot and to 12 to 15 c.c. was added $\frac{1}{50}$ to $\frac{1}{25}$ grain of bichloride of mercury in solution and the total volume was made up to 30 c.c. with normal salt solution. Lumbar puncture was performed and the spinal fluid was allowed to flow until the proper pressure was obtained, and the serum was allowed to flow in by gravity. This treatment was repeated every two weeks. Salvarsan was given every week for a period extending over two or three months, and the patients were discharged with the advice to return to the sanitarium at the end of three months, and, in the meantime, salicylate of mercury was ordered intramuscularly and potassium iodide by mouth.

This is very active treatment. In one year, 10 cases of syphilis of the brain and cord, 8 cases of tabes and 2 of paresis were treated by this method. The number of cases is small, too small to permit definite conclusions, but the results obtained by this vigorous treatment are worthy of note.

All the patients with tabes, except one, were markedly benefited by the treatment, and all returned to their occupations. The two patients with paresis were not improved, and one may have been made worse. In this patient the rapid increase of paretic symptoms occurred during the period of treatment, but this may have been merely a coincidence. The mentality of the other paretic patient declined during the treatment.

Nicholson believes that the use of mercurialized serum has given him more pronounced serological and clinical results than has salvarsanized serum. The symptoms which have been relieved by treatment were malaise, pain, painful muscular spasm, and decreased sphincter control, both of bladder and bowel. Ataxia has been much lessened in favorable cases. Serologically all cases showed improvement, and in two the spinal fluid became entirely negative, even to cholesterinized antigen.

¹ Clifton Medical Bulletin, September, 1916, p. 21.

It has been believed by Gilpin and Earley that *lumbar puncture* performed every week, or every two or three weeks, so as to reduce the pressure within the spinal column while *mercurial inunctions* are being given, helps to enable the mercury to pass into the cerebrospinal fluid. Pilsbury¹ has given this method a test in 10 cases of paresis, taboparesis or cerebrospinal syphilis. The patients were given mercurial inunctions 1 dram six days in the week, and were punctured every two weeks with few variations. In most cases the inunctions were continuous. They were not selected patients. The results were not striking, and Pilsbury thought similar effects might reasonably be expected without spinal drainage.

Ogilvie Method. This method has proven to be of much service to Stoner² in the treatment of 72 patients with 252 injections. The average number of treatments given a single patient was 4. The maximum number was 12. A positive lumbar puncture is an indication for intraspinal treatment, in his opinion, even though there are no definite clinical signs of such involvement. Much relief may follow a single intraspinal treatment in early neurosyphilis when general treatment has failed. High cell count and a positive Wassermann reaction on the fluid may quickly be brought to normal, and head pains may be almost instantaneously relieved. The tabetic, if intensively treated, becomes less ataxic, loses his lancinating pains and crises, and is improved in his mental and physical state. The clinical improvement does not necessarily parallel the laboratory improvement. Only a few cases were made completely negative on lumbar puncture findings, and it was not always in the negative case that the patient was completely relieved of annoying symptoms. Stoner has found it very difficult to make a fluid negative, and it is a question how much value a lumbar puncture has as an index to intensive therapy after symptoms are relieved. Biologic findings alone cannot be used independently of clinical findings as an index to therapy. It is not uncommon to find a blood which cannot be made negative to the Wassermann test after most intensive treatment, and this is more often true of the cerebrospinal fluid. Stoner has not had satisfactory results with paresis.

Knapp³ endorses intraspinal therapy in syphilis in the Swift-Ellis method. His opinion has been reached from the study of about 500 injections on over 100 patients, with pretty constant benefit and with no bad effects other than a temporary increase of pain, except in one case. He has not seen as striking improvement in cerebral cases as in spinal. He has seen tabetics who could stand only by the support of two nurses when treatment was first begun, who, after a few injections, could walk several miles with an approximately normal gait. He has seen a patient completely paraplegic, with total loss of control over the bladder and marked anesthesia, leave the hospital walking normally, with complete control of the bladder and with normal sensi-

¹ Journal of the American Medical Association, January 27, 1917, p. 267.

² Ibid., February 24, 1917, p. 610.

³ Boston Medical and Surgical Journal, July 6, 1916.

bility and reflexes after 3 injections. He believes the action of salvarsan is most pronounced when it is exerted most directly upon the spirochete.

He has now followed the method of Hammond and Sharpe in treating paresis by intraventricular injections of salvarsan, and reports his results in 2 cases, stating that it is too soon and his experience is too limited to permit him to come to any conclusion as to the merit of this treatment. The operative procedure he thinks is fairly safe. Changes in physical signs—the return of the patellar reflex and of the reaction of the pupils to light—observed after this treatment, in conjunction with the apparent general improvement—encourage him to continue with this method.

The findings of Fordyce¹ as to implication of the central nervous system in early syphilis do not indicate that the percentage is so great as some writers believe. In a series of cases of secondary syphilis examined in his service two years ago, less than 20 per cent. revealed abnormalities in the spinal fluid. Recently, another series of 63 cases was studied by lumbar puncture; 10 showed very slight changes as to lymphocytosis and globulin content, coming well within the borderline cases, while 15 exhibited a definite increase in cells and globulin, with a positive Wassermann reaction in 7. Thus 25 per cent. of the cases gave evidence of a definite pathological condition of the cerebrospinal axis, while 16 per cent. showed trifling abnormalities. The standard used was a cell count over 5, a globulin content demonstrated by the Pandy test, a positive Wassermann reaction in amounts to 2 c.c. of fluid, and the color changes elicited by the Lange test. Fordyce believes that the statistics in the literature, treating of abnormal fluids in the secondary stage of lues, and ranging from 10 to 90 per cent., are incorrect for the higher figures. It is possible that too much significance has been attached to minor changes, as increased pressure, increase of a few cells or a trace of globulin. He believes that only such individuals who show very conspicuous changes, as evidenced by a definite cell count, globulin and positive Wassermann, are candidates for one or the other of the different clinical types of cerebrospinal syphilis. These statements diminish the seriousness of syphilis in a measure, for it is hard to believe that everyone who has contracted syphilis has in the early stage the findings of nervous syphilis.

Probably no experienced neurologist will deny that pleocytosis, increase of globulin and a positive Wassermann reaction, may be present without causing serious symptoms, and that this condition may last a long time. Unquestionably, the fresh infection should be treated energetically. Fordyce thinks the spinal fluid should be examined at the completion of the treatment or, in the absence of physical signs, after a provocative injection of salvarsan, which should be given one year after the Wassermann reaction has been continuously negative.

It is interesting to know that Fordyce, during the past two years, has substituted the method of Ogilvie in intraspinal treatment for that of Swift and Ellis, and makes a direct addition of salvarsan to the

¹ Medical Record, September 30, 1916.

blood serum. He has found that in the larger percentage of cases there is little risk attending either intravenous or intraspinal treatment in disease of the nervous system, but treatment is not altogether harmless, and it cannot be emphasized too strongly that every precaution should be carefully carried out in regard to preparation, size of dose and sufficient rest in bed after treatment.

We are interested in knowing Fordyce's results in his vigorous treatment of nervous syphilis. In active progressive tabes the lancinating pains are ameliorated or disappear entirely. The gastric and rectal crises are usually controlled, or regress, and the ataxia is markedly decreased, and in some cases has disappeared. Disturbances of sensation partially or completely clear up. Sphincter control and sexual power have improved or returned to normal. The patients feel better, put on weight, and are able to resume their occupation, but reflexes do not return. His experience with optic atrophy is not very satisfactory, and the same may be said of paresis. He believes the treatment in paresis is of value in inducing remissions, making the patients socially possible and amenable to home care, and in a few cases restoring them, partially at least, to economic efficiency.

Tabes. TABES AND HEMIPLEGIA. It is stated by certain writers that if hemiplegia develops in a case of tabes, the tendon reflexes on the paralyzed side, which have been lost because of the tabes, become exaggerated. Souques¹ disputes the correctness of this view and reports a case of early tabes in which the patellar reflex was weak but not lost and the Achilles reflex was abolished; hemiplegia occurred, and the patellar reflex on the paralyzed side became exaggerated, while the Achilles reflex remained lost. From this case he argues that hemiplegia may cause exaggeration of a weak tendon reflex, but does not restore a lost reflex. The restoration must depend on the degree of impairment of the tendon reflex. If the afferent nerve fibers concerned in the reflex arc be destroyed by tabes, the degeneration of the pyramidal tract cannot cause a reflex to be produced through degenerated fibers, but one may suppose the existence of just that degree of degeneration sufficient to cause a loss of the tendon reflex but not too great to permit the passage of feeble impulses, which may be sufficient for a reflex when cerebral inhibition is removed.

THE ATAXIA OF TABES AND PERNICIOUS ANEMIA. I have spoken in my article in *PROGRESSIVE MEDICINE* of last year regarding Hoover's opinion on proximo- and acro-ataxia. He believed that, in tabes dorsalis, ataxia of the proximal extremity of the limb occurs earlier and can be demonstrated before acro-ataxia or ataxia of the distal portion of the limb. He believes he can differentiate between tabes and the subacute degeneration of the cord occurring in pernicious anemia, and he states that the ataxia of pernicious anemia begins in the distal ends of the limbs.

Frederick B. Clarke² has selected 10 cases of early tabes as a test for the correctness of Hoover's views regarding the onset of the ataxia

¹ *Revue Neurologique*, June, 1916, p. 898.

² *American Journal of the Medical Sciences*, October, 1916, p. 574.

in tabes. With one exception, they were all in the preataxic stage, and all cases with marked, or even moderate, incoördination in the performance of the usual tests for ataxia were not included. He has devised a system of charts for the purpose of more accurate testing of ataxia than is usually employed in tabes. For the full movement of the upper limb a large sheet of paper is used upon which a circle three feet in diameter is drawn. Within this, by means of a rubber stamp, twenty-four circles are made, each being one inch in diameter and at equal distance from each other, there being two rows around the margin of the circle. This chart is placed against the wall, the center of the circle being on a plane with the patient's eye. He is then instructed to mark a cross with a pencil in the circle, being careful to start and stop the pencil mark on the margin of each circle. To determine disturbance of flexion and extension of the elbow, lines are drawn across a sheet of paper, an effort being made to start and stop the pencil mark on given base lines. In making this test the patient is seated at a table with the elbows resting on its surface, and the lines are drawn by a movement of the elbow.

To determine coördination of the wrist a sheet of paper is used upon which are placed small circles one-fourth of an inch in diameter arranged in such a way that the lateral movements of the wrist are used in reaching the circles, within which a cross is made. It is impossible to rule out some slight movement of the finger-joints in this test.

To determine incoördination of finger movements a figure-of-five rectangles is made with a rubber stamp, each side of a rectangle being one inch in length, the object of the test being to determine any degree of incoördination of movement made in tracing the lines of the figure. In this test as well as in the preceding one the elbow is fixed.

For the full leg movement a sheet of paper is used upon which circles one inch in diameter are made, sufficiently far apart to bring out all movements of the fully extended leg. The patient stands on one foot, one arm being on a fixed support, to ensure steadiness of the trunk and one limb, leaving one limb free for the test. A leather device closely fitting the big toe, and containing a marker, is used to make a mark within the circle. Some other similar tests devised and described by Clarke are employed by him for further testing of coördination.

He concludes after this careful study that the ataxia occurring in early tabes is in large measure the result of an interference with certain afferent fibers which results in hypotonia and from the loss of the afferent impulses concerned in equilibrium; in the subacute combined sclerosis of the spinal cord in pernicious anemia the ataxia is caused more exclusively by interference with afferent fibers carrying impulses from the skeletal structures, *i. e.*, sense of position and of passive movement. The lesions in tabes are of greater importance in the production of ataxia than the lesions in pernicious anemia, and the hypotonicity of tabes has an important role in the ataxia. In tabes there is a more frequent and more marked ataxia in the distal than in the proximal articulations of the limbs, and the distribution of the ataxia cannot be used clinically as a means to differentiate tabes dorsalis from pernicious anemia.

OCULAR CRISES IN TABES. These crises are very rare. In the case of tabes reported by Michael¹ the patient had attacks of sharp, stabbing pain in his left eye, coming on at irregular intervals and lasting several seconds. During these attacks he saw momentary flashes of light before the affected eye, and also felt irritation in the eye resembling that caused by a hair. The conjunctival mucous membrane became reddened during the attack, and the eye became moistened with tears. On one occasion the patient stated that his left eye felt as though it was swollen to the size of a baseball. The skin over an area from the vertical midline of the face laterally as far as the external border of the left eyebrow and down as far as the mustache seemed to prickle and felt warm. Pain continued to be felt in the face all day, and numbness in that side of the face continued the following day. There were no visual disturbances.

CHARCOT JOINTS IN TABES. It is not rare to find arthropathy of the knee-joint in tabes, but bilateral arthropathy of the hip, as in a case observed by Wolfermann,² is distinctly noteworthy. The case he reports is interesting also in its course. A chancre was contracted in 1891. The patient had no secondaries, and his history showed no syphilitic manifestations from that time until 1912, a period of twenty-one years. During this period the man had married, and had an apparently healthy family above the average intelligence, so that the latency was one of twenty-one years.

Poliomyelitis. Much has been written on poliomyelitis, and, unfortunately, some of the contributions have added little or nothing to our knowledge. The paper by Neal and Dubois,³ however, is one of value. Both authors have been associated with the Meningitis Division of the Department of Health in New York, and have had much experience with poliomyelitis.

The rather numerous cases of poliomyelitis occurring between the periods of epidemics they speak of as the smouldering embers from which the sparks of conflagration may be disseminated at any time. The children born between the epidemics are most susceptible to the disease. These authors are convinced from animal experimentation that the virus of poliomyelitis is discharged in the secretions of the nose, throat and alimentary tract of patients suffering from the disease, and in the secretions of the nose and throat of individuals in intimate contact with these patients. The production of the disease in monkeys from the washings from the nose and throat of patients or their attendants has been accomplished many times. These authors also conclude that careful studies of epidemics in recent years have led to the conclusion that the mode of transmission of the disease is by actual personal contact rather than through intermediary means such as dust, flies and insects. The mode of transmission is one of the most disputed questions raised in regard to this peculiar disease.

They speak of a mode of onset by no means generally recognized.

¹ Journal of the American Medical Association, December 23, 1916, p. 1936.

² Ibid., November 25, 1916, p. 1590.

³ American Journal of the Medical Sciences, September, 1916, p. 313.

In this the disease is ushered in by somewhat indefinite symptoms of an intestinal, coryzal, or anginal nature. A remission of from one to several days then occurs, to be followed by return of all symptoms and usually by an accompanying paralysis. This form I have seen, but it appears to be rare.

The abortive cases are very likely to be overlooked, therefore it is well to note what Neal and Dubois say about them. The symptoms may subside within a few days without any evidence of paralysis; or the condition may persist for two or three weeks, presenting a clinical picture which is most difficult to differentiate from tuberculous meningitis. Very often the symptoms are very definite. In the presence of an epidemic an unexplained temperature, especially if accompanied by general hyperesthesia, is sufficiently suspicious to warrant a lumbar puncture.

Examples of the bulbar type of paralysis, with difficulty in speaking and swallowing, have not been uncommon in the recent epidemic.

The spinal fluid in poliomyelitis usually is clear, or rarely, in the early stages it may be slightly cloudy. It often shows a good fibrin web formation. The reduction of Fehling's solution is prompt. There is a slight or moderate increase of albumin and globulin and also of the cellular elements. As a rule, 80 per cent. or more of the cells are mononuclears.

Neal and Dubois can give us no information as to the value of the serum treatment, but they believe that after the very early stage the patient's own antibodies would far outnumber those in the sera of cases of some months' or years' duration. The greatest hope of success in combating poliomyelitis lies perhaps in a prophylactic vaccination. Work in this direction they state, is being done.

THE USE OF SERUM FROM PERSONS WHO HAVE RECOVERED FROM POLIOMYELITIS, however, is too recent a treatment to permit definite conclusions. Le Boutillier,¹ in his experience derived from the study of 768 cases at the Philadelphia Hospital for Contagious Diseases, has decided that immune serum is of value. They were handicapped in this hospital by the comparatively small amount of serum available, and by the fact that at first it was reserved for use in only the most desperate cases. Later it was given to patients entering on the first or second day of the acute paralytic stage, and then results were better. It was given in doses ranging from 5 to 15 or even 30 c.c., either intraspinally, intravenously, or intramuscularly, daily or every two or three days for several doses. At times a combination of adrenalin chloride in the morning and immune serum at night was used on consecutive days, apparently with better results than when given alone. In at least two very severe cases with chest involvement the improvement following this method of treatment was marked. When a severe toxemia is present, showing a marked general involvement, the intravenous use of the serum is especially recommended. When paralysis alone occurs, the intraspinal method of administration seems to be most effective.

¹ American Journal of the Medical Sciences, February, 1917.

The intramuscular method he recommends only when it is impossible to give the serum into a vein, as the absorption is much slower. Another method of procedure when the toxemia is marked is the intravenous use of a hyperisotonic salt solution, following the removal of an equal or smaller quantity of blood; the quantity removed varying from 5 to 30 c.c., depending upon the age and condition of the patient.

It is generally held that one attack of poliomyelitis protects against a RECURRENCE, but E. W. Taylor¹ believes from one observation that this rule occasionally does not work. We may still hold that two attacks very seldom occur in the same person. The evidence in the case reported by Taylor points to two distinct attacks separated by an interval of three years. In the first attack, the right leg and left arm were chiefly affected, the paralysis of the right leg disappearing in great measure, but still showing in some degree at the present time. That this was an actual paralysis at first of a considerable degree of severity Taylor believes is shown, not only by the statement of the mother, who said the child was obliged to learn to walk over again, taking a year in the process, but also more conclusively by the photograph of the child's shoe worn on the inner side of the forward part of the sole from the dragging of the foot in walking.

The second attack coming on at the age of six affected the left leg, and was clearly one of poliomyelitis.

From a survey of cases collected by Taylor a second attack in some of these might be regarded as an exacerbation, but in others the interval between the two attacks was too long to permit of this explanation.

The Alteration of Electrical Reaction in High Transverse Lesion of the Cord. In complete transverse lesions of the spinal cord Marie and Foix² have observed alteration of the electrical responses in muscles innervated below the level of the lesion, even in some instances complete loss of electrical reaction. In one case with necropsy they discovered intense neuritis predominating in the external popliteal nerve. Claude and Lhermitte have also in a similar case observed lesions in this nerve. Marie and Foix now report four clinical cases of incomplete transverse lesion with alteration of the electrical responses. While some other cases of this character have been reported in literature, Senator and Rose have recorded cases in which severe lesions of the peripheral nerves were absent. Marie and Foix have been impressed by the great frequency of a marked alteration of the electrical reactions in complete or incomplete traumatic lesions of the cord, and the association of this alteration with changes in the tendon reflexes. The tendon reflexes and the reflexes of automatism are lost in these cases when the electrical excitability is gravely affected. The alteration of the electrical reactions is likely to be most intense in the external popliteal distribution, and on the integrity of the extensor of the big toe depends the Babinski reflex; it seems logical to conclude, in the opinion of these authors, that the loss of this reflex is caused by the electrical alteration.

¹ Journal of Nervous and Mental Disease, September, 1916, p. 207.

² Revue Neurologique, 1916, No. 3, p. 422.

The law of Bastian, that complete high transverse lesion of the cord causes abolition of tendon reflexes, is not exact, as exceptions are known. The electrical changes cannot always be attributed to neuritis, but it is not determined to what cause or causes they should be attributed, and they should be sought for in every case where the tendon reflexes are lost after a high lesion of the cord.

Paratonia. A peculiar form of paralysis has been observed by certain French neurologists during the war. As Marie and Foix¹ have described it, it consists of weakness of the affected part of such a character that voluntary movements are possible but are feeble; some movements may be lost, and the cause is spasm of the muscles opposing those concerned in the movement. The name paratonia is given to hypertonia of certain groups of muscles with hypotonia of their antagonists. In evidence of the organic nature of the palsy is muscular hyperexcitability to percussion, such as is seen in the paralyzed side in hemiplegia. The hyperexcitability is observed especially in the hypertonic muscles, but in less degree in the hypotonic muscles. Usually the hypertonic muscles show increase of tendon reflexes and the hypotonic decrease, but this is not an invariable rule. There may be modification of temperature in the affected muscles, or slight change in the electrical reactions. It will be difficult at times to distinguish an organic palsy of the character here described from one of purely functional nature, even though one may be on the alert for disturbances of reflex activity, tonicity, vasomotor and trophic functions and temperature.

Spinal Cord Changes in Anemia. Cadwalader² has been able to report 9 cases of pernicious anemia in which the syndrome described by Dejerine existed. In all these cases more or less disturbance of voluntary motor power of the lower limbs, with ataxia and moderate spasticity, was observed. The tendon reflexes were exaggerated. The patients all complained of subjective disturbance of sensation, but the disturbance of objective sensation is the peculiarity of pernicious anemia. Bone sensation, as tested by the appreciation of the vibrations of a tuning-fork, was lost or modified in the lower limbs in every case. The inability to recognize the position of the toes, associated with diminished appreciation of passive movements of the toes or fingers, was present in all cases. In cases presenting "the syndrome of the long root fibers of the spinal cord," unlike in tabes, the superficial sensations, especially the tactile sensation, remain intact. The sclerosis of the posterior columns is centrally situated and only the fibers which ascend in the posterior columns are affected. These fibers are concerned with the sensations of position, passive movement and vibration.

Abscess of Spinal Cord. Abscess is not uncommon in the cerebrum and cerebellum, but is very rare in the pons, medulla oblongata, and spinal cord. It is decidedly more uncommon in these parts than is hemorrhage, and yet hemorrhage of the spinal cord without trauma is rarely seen.

¹ *Revue Neurologique*, March, 1916, No. 3, p. 407.

² *Journal of Nervous and Mental Disease*, November 19, 1916.

In the case of spinal cord abscess reported by Charles W. Hitchcock¹ the clinical diagnosis seems to have been difficult, but the author believed that the blood count and the course of the disease pointed to the existence of an infection involving the cord, and operation was undertaken. The spinal dura was opened but nothing pathological was found. The cord was not incised. The patient died eighteen days after the operation. The lower seven inches of the cord at necropsy showed the central portion filled with thick creamy pus. The clinical diagnosis had been myelitis, and probably the correct diagnosis was impossible. The abscess probably was a metastatic one from suppurative lesions in the hands, a staphylococcal infection following the bite of a horse.

Paralysis during the Pasteur Treatment. Seven cases of paralysis occurring during Pasteur's antirabic treatment is an unusually large number for anyone to put on record, but this is what Fielder² has done. As he says, this complication occurs with great rarity, and usually terminates in recovery, so that it should be considered no bar to antirabic treatment when this is evidently needed; but the possibility of paralysis should always be explained to those in whom infection is doubtful, or who are inclined to insist on being treated merely as a sentimental matter of precaution.

The symptoms vary from a slight degree of neuritis, with little or no motor involvement, to an acute ascending paralysis which may be fatal. In 37 cases reported by Remlinger, the legs were involved in 34, the sphincters in 27, face in 10, and arms in 7 of the cases, while bulbar symptoms were present in only 2. The number of cases collected by Fielder, including his own, is 142, with 24 deaths, but he believes that the mortality of these reported cases, 16.2 per cent., must not be taken as representing the true mortality incident to this complication of antirabic treatment, since it is certain that many mild cases are not reported. Fielder divides the cases into three classes. The mild ones with transitory paralysis of face or limbs all recover. The acute paraplegias of the lower extremities with or without involvement of the sphincters usually recover. Death, if it occurs, is likely to be due to cystitis or bed-sores after a prolonged illness. The most severe cases presenting the clinical picture of acute ascending paralysis of the Landry type have a bad prognosis. In Fielder's 7 cases, the symptoms first appeared during treatment in 6 cases, and three days after its completion in 1 case. The average was twenty-three days after the bite and seventeen days from beginning of treatment. Fielder accepts Simon's statement as correct, *viz.*, that whether one counts from the date of the bite or from the beginning of treatment, the incubation is shorter than in most cases of rabies. This he considers important in view of the contention of some writers that the condition is one of true rabies caused by the bite, but rendered mild by the antirabic treatment.

The onset of the symptoms is usually acute, with pain and numbness of the affected parts, followed by muscular weakness. Prodromal

¹ Journal of the American Medical Association, May 5, 1917, p. 1318.

² *Ibid.*, June 3, 1916, p. 1769.

symptoms, if present, are mild, and consist only of malaise and nervous depression, with perhaps some restlessness, insomnia and anorexia. Males are affected more than females, probably because more males are bitten, and thus more are treated. Most of the cases are in adults, and it seems that a special idiosyncrasy on the part of the patient must exist.

In a case studied by Jochmann, marked changes were found in the spinal cord. The etiology is uncertain. Anaphylaxis has been regarded as the cause by some; others attribute it to the specific action of a "rabies toxin" which is in combination with the fixed virus used for treatment; others attribute it to street virus infection, received from the biting animal, and so modified by treatment that the disease runs an atypical and usually mild course ending in recovery; others attribute it to fixed virus infection due to the treatment.

Fielder concludes this valuable paper as follows:

Paralysis complicating the Pasteur antirabic treatment probably occurs in mild form more often than is known. While the administration of antirabic treatment is not entirely devoid of risk, the possibility of the occurrence of paralysis in any particular case is so slight that it should not deter those who evidently need antirabic treatment. A person bitten by a rabid animal is much more likely to develop rabies, which is certainly fatal, than paralysis from the treatment, which usually ends in recovery.

He believes that in most instances this paralysis is caused by the antirabic treatment itself (fixed virus infection, or toxin, or both). It is not often due to street virus infection modified by treatment. Variations in the strength of the fixed virus used are probably a factor in the etiology, and personal idiosyncrasy is an important predisposing condition.

Laminectomy with Exposure of the Cord. Elsberg and Bailey¹ assert that the surgical exposure of the spinal cord, even in the absence of increased intradural pressure, may of itself effect some change in the spinal cord which benefits or checks the symptoms of certain forms of spinal-cord disease. Laminectomy and incision of the dura often have an immediate effect on the spinal reflexes. In many cases the knee and ankle jerks become markedly depressed or disappear altogether within thirty minutes of the opening of the dura, and this depression or disappearance of the reflexes may persist from six to twenty-four hours. These changes often affect all the spinal reflexes, whatever part of the cord may have been exposed. They have seen the reflexes of both upper and lower extremities modified after opening the midthoracic region, but more often the reflexes below the opening are affected. These phenomena cannot be attributed to trauma of the cord during the operation or to bleeding into the membranes, for the diminution or loss of reflexes occurs when the operation has been very simple without appreciable injury to the cord. Since a similar change in the reflexes may occasionally be observed after simple spinal puncture, these authors conclude

¹ Journal of the American Medical Association, June 10, 1916, p. 1852.

that changes in intradural pressure with resulting modification of the spinal circulation are the important factors. They have not observed these changes after operations in which the dural sac remained unopened. A similar disappearance of reflexes is often observed after severe trauma of the skull or spinal column.

They state they have observed in a large number of patients exaggeration of the knee-jerks, ankle clonus and Babinski phenomenon disappear and only normal reflexes persist for a number of hours or days after an operation on the spine consisting of laminectomy and incision of the dura, when no definite spinal lesion could be discovered.

In one of their patients in whom exploration failed to discover any lesion, ankle clonus and the Babinski, Mendel and Oppenheim phenomena disappeared for thirty-six hours after the operation, and the reflexes became normal. In some of their cases the improvement lasted much longer. It is interesting to know that they have not seen any benefit where exploratory operation exposed the conus and cauda equina.

Removal of Tumor within the Spinal Cord. The successful removal of a tumor within the cord substance is still of sufficient importance and so infrequent as to make every case worthy of report, and a recent case of the character is recorded by Dercum and Da Costa.¹ At the operation, a longitudinal incision was made into the cord, and immediately a dark, bluish-red mass began to extrude. The incision was enlarged until it was about an inch in length, the wound was closed and five days later a second operation was done. The extrusion of the tumor mass had continued though a part still remained in the cord. The tumor was then gently extracted. Improvement followed the operation although it was slow.

Elsberg was the first to recommend this method of procedure for intramedullary spinal tumors, and he has operated upon a considerable number of cases.

Syndrome of Massive Coagulation in the Spinal Fluid. The review by Hanes² of the spinal fluid syndromes of Nonne and Froin is of importance at this time. Froin found a yellow color of the fluid (xanthochromia), and the fluid on standing coagulated spontaneously and massively, owing to its high fibrin content. Nonne found an excess of proteid (strongly positive phase), with no leukocytosis (pleocytosis) of the fluid. This dissociation of proteid excess and pleocytosis in 3 cases he did not at first know how to explain. Others have obtained similar findings, but Hanes believes he is the first to show that Froin's findings and Nonne's are closely related, and that the syndrome of Nonne is simply the early manifestation of a process which in its later and terminal phases gives rise to the syndrome of Froin. The Nonne-Froin syndrome is of the greatest practical assistance in the differential diagnosis of spinal cord lesions. Erythrochromia, hemorrhagic coloration of the spinal fluid, must be distinguished from xanthochromia. The color in erythrochromia varies from a bright red through varying shades of reddish

¹ Journal of Nervous and Mental Disease, August, 1916, p. 97.

² American Journal of the Medical Sciences, July, 1916.

brown, reddish yellow to a dark yellow color. Lumbar punctures made at intervals of several days in a case with hemorrhagic spinal fluid have shown a variety of color changes, whereas the color in xanthochromatic fluid remains the same from puncture to puncture. The shades in xanthochromia may be amber, cream or straw color.

In erythrochromia the fluid may be blood red to reddish-yellow in color, and the fluid yields positive chemical tests for blood, although in later stages the spectroscope may fail to reveal characteristic bands. A leukocytosis may develop from meningeal irritation. In xanthochromia the white cells usually are not increased, there are no red cells, and the fluid does not yield either chemical or spectroscopic evidence of hemoglobin derivatives.

The fibrin content of xanthochromatic fluids is high and the fluid coagulates spontaneously and so massively, that the test-tube may be inverted without loss of its contents. The erythrochromatic fluid does not coagulate massively. Both fluids contain much proteid substance, but in the erythrochromatic fluid the proteid tends to decrease in amount the further away in time from the hemorrhage the fluid is removed.

The syndrome of xanthochromia, as Hanes remarks, with massive coagulation of the spinal fluid and high proteid content, with or without pleocytosis, is always produced by a localized obliteration of the pia-arachnoid space which divides it into two parts, an upper one in free communication with the pia-arachnoid spaces of the upper cord and brain and a lower cul-de-sac. In this lower cul-de-sac the fluid gradually changes in character from the normal limpid spinal fluid to the xanthochromatic type described. Hanes believes the xanthochromia syndrome is produced by transudation of blood serum into the pia-arachnoid cul-de-sac, owing to stasis produced by pressure upon the veins of the pia at the site of cord compression. The high content of such fluids in fibrin and proteids, and the presence in them of a few cells, support the view that in these cases there is a transudate analogous to pleural transudate due to venous compression.

Ayer and Viets¹ had 12 cases of cord lesion, all personally known to one or both of them, either from the laboratory or the clinical side, and usually from both points of view, in which the spinal fluid compression syndrome was shown in its complete or incomplete form. In all there was proof of cord pressure either by operation or necropsy, and in only one case did proof depend on a combination of clinical and Röntgen-ray evidence. They conclude that:

1. Changes in the spinal fluid frequently occur as a result of compression of the spinal cord.
2. The principal characteristic of such compression fluid is marked increase of proteins without corresponding cellular increase, obtained under normal pressure.
3. Xanthochromia with massive coagulation added to the above makes a more intense reaction of the same significance, only more conclusive.

¹ Journal of the American Medical Association, December 9, 1916, p. 1707.

4. Factors which tend to give the syndrome most readily, or to give it in its most intense form, are processes which act rapidly, are intramedullary or cause pressure on the cord from all sides, and which affect the lower cord.

5. Such findings are not necessarily present in cord compression, but they are confirmatory evidence of value in some cases.

Elsberg, however, states that he has been unable to discover anything characteristic in the spinal fluid in spinal cord tumor. In 30 cases of extramedullary spinal cord tumor on which he operated, xanthochromia was present in 6, but in 5 of these 6 cases the tumors were of the conus and cauda equina, the other was a tumor in the lower dorsal cord. In a considerable number of his patients there was neither an increase of globulin nor an increase in the number of the cells, nor anything else abnormal. In at least one-third of his cases the spinal fluid was normal in every respect. In the absence of abnormalities in the spinal fluid therefore he believes there may nevertheless be pressure on the spinal cord.

The importance that this compression syndrome may have in a doubtful case is shown by Sprunt and Walker¹ who, among other cases, describe one in which the diagnosis of a systemic disease had been made, for which little could be done, but the finding of the peculiar condition of the fluid by lumbar puncture called attention to the mistake, and led to the proper diagnosis.

Obstetrical Paralysis. Important observations in regard to this subject have been made by J. J. Thomas and Sever² in a study of 471 cases. There was no reason to expect any difference as to sex. The right arm was affected 272 times, and the left 186, about 68 per cent. being in favor of the right arm. In 9 of the cases both arms were affected. The types of paralysis differed, the most common being the so-called upper arm type, 400 of this type being recorded as against the so-called lower or whole arm type, where, in addition to the injury of the fifth and sixth cervical roots, there is injury of the seventh and eighth cervical and first thoracic roots. Of this type 84 cases were recorded. In the 9 cases in which both arms were affected, the paralysis was of the lower or whole arm type.

In 418 cases the labor was long, laborious and difficult; in 363 cases ether was used and in 317 forceps; in 32 labor was apparently normal, and in 102 the child was asphyxiated. All the conditions noted above imply the application of force combined with great muscular relaxation of the child, conditions peculiarly favorable for the production of such an injury.

In regard to the presentations, 219 at least were vertex or face presentations, and 66 were breech, which latter classification includes versions and footlings. In 186, the position was not recorded, but in a large majority of these it undoubtedly was vertex.

The conclusions of these observers, based upon their extensive study, which in many instances included the examination of the child in the

¹ Bulletin of the Johns Hopkins Hospital, February, 1917.

² Journal of Nervous and Mental Disease, October, 1916, p. 289.

first few days of life, are that obstetrical paralysis is due to injury of the brachial plexus, in the great majority of cases from stretching, and this may be the only method of producing the injury; and that their clinical facts, their anatomical facts and experimental work all exclude the possibility of its being produced by dislocation of the shoulder, or injury of the capsule of this joint, or separation of the epiphyses.

They do not assert that such accidents do not happen, and thus produce a condition which may be called pseudoparalysis, but in the great majority of instances, like fractures of the clavicle, they are complicating conditions due to the difficult labor, and accompanying the injury of the plexus.

Operation is advisable if the case is seen early, but resection should not be considered under the age of six months, and in most cases in not less than twelve months, while eighteen months is not at all too late. Reëducational exercises are of much service. Attempt is made to prevent the formation of contracture by passive movements. To these are gradually added active movements, first aided than unassisted through the appeal to the child by imitating movements of the well arm, and then through games, as if measuring ribbon. Massage also is used.

Cortical Lesions in Beriberi and Similar Conditions. According to Lhermitte,¹ it is well known that food consisting exclusively of decorticated rice may cause, especially in birds, a disorder resembling closely beriberi in the human being, which is dependent upon the absence of a certain substance found in the covering of the rice grain. Kassimir Funk has shown that this substance is vitamin, and that this is necessary for the nutrition of those developing as well as of adults. Loss of vitamin in the food produces various maladies, beriberi, pellagra, Barlow's disease, and scurvy. These are called by Funk avitaminoses. Lhermitte thought it would be interesting to determine whether there is change in the finer structure of the brain in avitaminic polyneuritis, on account of the identity of the lesions in the peripheral nerves in experimental avitaminosis and human avitaminosis, such as is seen in beriberi or pellagra. He found that food consisting solely of decorticated rice was not only able to produce degeneration of peripheral nerves in chickens, but also pronounced cortical lesions, consisting of changes in the form and staining of the cells, progressive disintegration and proliferation of the neuroglia.

The paper by Vedder² is interesting in this connection. A pure vitamin has not been isolated. The term "vitamin" is simply a convenient expression to use in place of the phrase "accessory food substance." Vitamins are necessary to life.

The deficiency in the dietary that causes beriberi is not limited to rice, and it has been shown repeatedly that too exclusive diets of ordinary white flour, canned goods that have been sterilized, and most carbohydrate foods such as sugars and starches, tapioca, sago, hominy and certain kinds of corn meal will produce polyneuritis in fowls and

¹ *Revue Neurologique*, November, 1916, No. 7, p. 6.

² *Journal of the American Medical Association*, November 18, 1916, p. 494.

beriberi in man. Beriberi has been reported repeatedly in communities, asylums, prison camps, etc., where the diet has consisted largely of such foods.

Where pellagra is prevalent in the United States, the sufferers from that disease are living largely on articles that have been demonstrated to produce either beriberi or scurvy or both, namely, flour, corn-meal, canned goods, salt meat, etc. It is possible that these people have been protected from scurvy and beriberi because they have eaten a sufficient quantity of other foods that protected them against those diseases, such as fruit and beans, but left them susceptible to a third deficiency that produced pellagra.

According to Vedder, it is absurd to assume that pellagra must be an infection or an intoxication because of its peculiar pathology. The degenerations in the nervous system in pellagra resemble certain known intoxications, but so does the degeneration of the nervous system in beri-beri.

Signs of Complete Lesion of Nerves. An attempt has been made by Pitres,¹ at a special meeting of the Paris Neurological Society, to distinguish clinically a complete from a partial lesion of a nerve. He states certain facts that are known to every physician and some others less generally known. It is not until the fourth day after a complete lesion of a nerve that its electrical irritability is altered, and within a few hours may then be lost. The affected muscles preserve their mechanical and electrical irritability two or three weeks after the nerve has been divided, then they become less excitable and later lose their faradic irritability while preserving their galvanic irritability but showing reaction of degeneration. Less well known is the condition of mechanical irritability. A normal muscle when struck by a hammer responds by a contraction of short duration, and this mechanical irritability is preserved or even increased during the first few weeks after section of the nerve, and is present even when faradic irritability is lost, but with reaction of degeneration the muscle irritability to mechanical stimulus shows by slow contraction, and is the last sign of muscle response to disappear. So long as the mechanical reaction is quick, the muscle is not greatly altered; when slow, the reaction of degeneration may be assumed to be present, and when lost the muscle is irrecoverably degenerated. It is difficult to apply the test of mechanical irritability to fat persons and to certain muscles even in thin persons.

In complete nerve lesion, sensation of the part is lost, but the superficial sensation of a part may be lost when its deep sensation is preserved. The ulnar nerve innervates the skin, bones and muscles of the internal portion of the hand, therefore when it is completely divided the anesthesia of the entire part is complete. The radial nerve supplies sensation to the superficial part of the back of the thumb and external part of the back of the hand, while the tissue beneath is innervated by the median. A complete lesion of the radial gives anesthesia only to very delicate tests while the slightest pressure permits sensation to be

¹ *Revue Neurologique*, 1916, Nos. 4 and 5.

recognized; one might therefore conclude wrongly that the radial nerve was only slightly affected, whereas in reality its function was entirely abolished.

The vasomotor and trophic disturbances are especially interesting. It is common to find in nerve lesions disturbances in blood supply, in temperature, in perspiration, in growth of hair and nails, in the nutrition of the skin and bones, and sometimes skin eruptions occur. It is common to find, after complete division of a nerve, marked dilatation of vessels shown by congestion when the limb is dependent. Pitres believes that osteoporosis of the foot or hand may often develop after grave nerve lesions, but may also occur after different surgical conditions, and even in functional paralysis when prolonged fixation has occurred. On the other hand, it does not always develop after division of nerves. Decalcification of bone, therefore, may not permit by *x*-rays a diagnosis between organic or functional paralysis. Hypertrichosis may occur even in functional disturbance and cannot be used as evidence of nerve lesion. The same may be said of vasomotor, secretory and trophic signs. The causes of these disturbances are obscure, the nerve lesion plays a role probably but is not the only cause, but other conditions, such as obliteration of vessels, are important.

After this careful analysis of symptoms, Pitres concludes that the most one can do is to determine that there is a complete physiological separation of a nerve, but he is unable from symptoms alone to diagnose an anatomical division of a nerve.

Villaret attributes more importance to hypertrichosis in nerve lesions. According to him, when hypertrichosis of the affected part occurs with paralysis or contracture of nerve origin, as shown by the symptoms, it should make one suspect that the lesion is incomplete and capable of regression, and the treatment should be prolonged use of electricity or liberation of the nerve.

No alteration in the growth of the hair when there is a peripheral paralysis without the signs of organic condition should confirm the diagnosis of functional palsy; but in such a palsy the occurrence of hypertrichosis with trophic lesions and exaggeration of the idiomuscular reflex should lead to the diagnosis of psychoneurosis associated with nerve lesion, or one of vascular or sympathetic origin badly defined.

Henry Meige, with Madame Athanassio Bénisty, has observed the frequency of vascular lesions with nerve lesions in a great many cases where vasomotor, secretory and trophic disturbances were pronounced. He has studied the condition of the vessels, especially of the arteries, by comparing the pulse and taking the blood-pressure in symmetrical limbs, and he has become convinced that serious vasomotor disturbance frequently depends on arterial disease in association with the nerve lesion, but other causes are important in vasomotor and trophic symptoms, especially important is the sympathetic system. The median and sciatica nerves are rich in sympathetic fibers, and especially with lesions of these nerves are vasomotor and trophic symptoms present. Sympathetic fibers accompany vessels and frequently are injured with the nerve lesion; these fibers are important in vasomotor and trophic symptoms.

Meigs warns against laying too much stress on the degree of tonicity, as it varies considerably under normal conditions, and we are far from understanding the causes and significance in variations of tonicity. He has seen extreme hypotonicity followed by recovery of function without intervention, and it may occur where the nerve lesion is slight. Edema may mask both flaccidity and atrophy, which may be properly recognized only after the edema has disappeared.

The absence of all pain on pressure in the muscles paralyzed by a nerve lesion does not indicate a severe lesion with loss of all conductivity, although it might be regarded as suggestive of such a lesion.

Dejerine and Madam Dejerine point out that a few fibers pushing their way through the scar tissue formed within an injured nerve do not give clinical signs sufficiently intense to permit a diagnosis of beginning regeneration, but so soon as these fibers are in sufficient number their existence may be recognized before they have penetrated to the end of their course by the pain on pressure below the nerve lesion. This tenderness may appear a few days after a suture of a nerve made under good conditions, and the first signs of paresthesia to pricking and pinching and return of tonicity may be observed within a few weeks following the suture, *i. e.*, between the fifteenth and the fiftieth day.

Neuralgia of Jacobson's Nerve. Persistence of pain after intracranial operations upon the fifth nerve has occasionally been very perplexing and it is important to know that the pain may really be in another nerve territory. As I have no command of the Russian language, I am obliged to refer to an abstract of an important paper by Shtsherbak.¹ In this it is stated that in a case observed by him the symptoms of neuralgia of Jacobson's nerve, the tympanic branch of the ninth cranial nerve (glossopharyngeus), were paroxysmal attacks of acute shooting pains in the depth of the left ear, radiating into the pharynx, lower half of the face and temporal region. The pain was particularly severe in front of the ear, in the left temporal and anterior portion of the parietal region. The teeth, eyes and forehead were normal. During the attacks there was a bitter taste in the mouth, but no disorders of secretion of saliva. Movements of the head or deglutition did not increase the pains. Painful points were found in front of the ear, at the emerging point of the facial nerve, and on the neck between the middle of the lower edge of the jaw and the inner border of the sternocleidomastoid. Shtsherbak thinks that these symptoms confirm the connection of the ninth nerve with the auriculotemporal branch of the fifth nerve. On the other hand, his observation shows that the fibers of the ninth nerve, in human beings, do not conduct secretory impulses for the parotid glands, as has been experimentally established for animals. In the case reported, treatment consisted in galvanization of the painful points, diathermia treatment of the parotids, hypodermic injections of arsenic, supplemented by correction of retroversion of the uterus, parametritis and salpingo-oöphoritis. The patient was greatly improved.

¹ Abstract in Journal of the American Medical Association, July 29, 1916, p. 399.

Facial Diplegia in Multiple Neuritis. Paralysis of both facial nerves is rather uncommon in multiple neuritis. Patrick¹ has collected 29 cases including 3 of his own, but 2 or 3 of these cases are somewhat doubtful. The relation of this form of facial palsy to the unilateral or bilateral form without multiple neuritis is close.

Sciatica. Some physicians, chiefly orthopedic surgeons, have shown a tendency to dispute the existence of idiopathic sciatica. Rogers,² in a recent paper, states there is no clinical entity known as sciatica. The accepted theory of a perineuritis due to some inflammatory condition of the nerve sheath is not proved, and there is always a definite cause at the origin of the nerve. The most common cause of sciatic pain, he thinks, is a joint lesion, situated at the origin of the nerve, and the nerve is implicated secondarily. It is very common in sciatica to have the pain referred to the lower portion of the spine, starting from that region and extending down the course of the nerve. Often the patient will put one finger directly over the sacro-iliac joint or the lumbosacral joint and locate the pain definitely at the joint.

The reading of this paper called forth much discussion, and while some, like Ely, believed there is no such disease entity as sciatica, and that sciatica means pain in the sciatic nerve, a symptom, not a disease; others, like Henderson, believed there is a definite group of cases in which a cause for the sciatica cannot be found. Sayre would look for the cause of the pain in fissures in the rectum, carcinoma, retroverted uteri, prolapsed ovaries and dilated colons. Anything resting on the sciatic nerve and hurting it or the sacral plexus may cause this pain. Fisher believed the pain might be a reflex from the joint, as pain in hip-joint disease is referred to the knee.

It is indeed a narrow view to hold that all sciatica is primarily in the nerve and to ignore joint disease, but it surely is equally narrow to attribute all sciatica to joint disease.

Lumbar Puncture. From the observations of Newmark and Beerman³ it is evident that lumbar puncture occasionally may produce much more serious results than is generally believed. These authors state that they have seen conditions result from lumbar puncture which would make them hesitate where most would venture boldly. It is well known that brain tumor cases are unsuitable for this treatment, but it is not so generally known that when the tumor is intraspinal the effect of the puncture may be increased pressure on the cord.

In one of their cases where there was an intradural psammoma opposite the second dorsal spinous process, the paresis of one of the lower extremities was converted into complete paralysis after about 6 c.c. of fluid had been removed.

In another case of pressure on the cord by the same kind of tumor, a dry tap was as productive of serious results as a copious flow of fluid. The patient was a woman who had slight weakness of one foot, but she walked without much difficulty, and even danced. Lumbar punc-

¹ Journal of Nervous and Mental Disease, October, 1916, p. 322.

² Journal of the American Medical Association, February 10, 1917.

³ Medical Record, April 28, 1917.

ture was attempted several times without obtaining fluid. On the following day she complained of headache, her lower limbs began to get weak, and in three days after the puncture there were almost complete paralysis of one lower extremity, paresis of the other and anesthesia. The signs of spinal tumor became more distinct and the patient recovered completely after removal of the tumor.

In two other cases, one of cerebrospinal syphilis and the other probably of multiple sclerosis, a dry tap was followed by headache. Such cases are exceptional, and it is important to remember that sudden or rapid aggravation of symptoms may occur without any relation to puncture. These authors record a case in which had the symptoms been a little delayed they probably would have been attributed to lumbar puncture. A woman had hemiparesis which had come on rapidly and lumbar puncture was arranged for a certain date. On their arrival to perform the puncture they found that violent headache had developed during the night, paresis had changed into absolute paralysis and other symptoms were present.

PUNCTURE HEADACHE. The symptoms produced by lumbar puncture are so frequent that it is well to be familiar with them, and Dana¹ has done good service in classifying them. The headache he finds seldom begins until the day following the puncture, when the patient usually is allowed to get up. It may start directly after the puncture, or begin three days later, depending on the activity of the patient and the condition of the cerebrospinal fluid circulation. The pain may be frontal or occipital, and may be with nausea and vomiting. The symptoms are increased by exercise and relieved by lying down. The condition lasts with remissions for five or six days to two or three weeks. It is more common when the fluid is negative and is under low pressure. It is more common and severe in young adults, in women, in neurotic persons and the anemic. In acute condition, with high fluid pressures puncture often relieves headache.

The headache can usually be prevented by keeping the patient in a horizontal position for three or more days. If headache occurs, the patient should go to bed. Possibly it may be prevented by withdrawing the fluid very slowly. The location of the pain in puncture headache is much like that in the neurasthenic and autotoxic headaches. In these also the patient is more comfortable if he lies down, and physical or mental exertion makes him worse.

LUMBAR PUNCTURE FOR RELIEF OF DELIRIUM IN LOBAR PNEUMONIA. This seems to be a new cure for a severe form of delirium, employed by Musser and Hufford,² and is of value because depressing drugs are not desirable in pneumonia. These investigators could not find lumbar puncture recommended for delirium in any of the standard works. It has been recommended by Roger and Baumel for the alleviation of headache in pneumonia, and it has been employed in delirium tremens, as it is thought the increased intraspinal pressure is responsible for the delirium in this condition.

¹ Journal of the American Medical Association, April 7, 1917, p. 1017.

² Ibid., April 28, 1917, p. 1231.

Musser and Hufford believe that in a certain number of cases the pneumococcic toxins may have a greater affinity for the spinal membranes than in other cases. Such cases respond to the irritation of this toxin by the secretion of increased amounts of fluid by the choroid plexus. As a result of this the usual channels of escape are blocked up and the increase of pressure causes changes in the brain cells with the subsequent delirium, therefore lumbar puncture is indicated. In 7 of their cases of pneumonia associated with severe delirium, relief of the delirium promptly followed spinal puncture. They feel that lumbar puncture offers a ready aid in controlling one of the symptoms which may so aggravate the patient's condition that what little chance he may have of surviving the infection would be lost were it not for this procedure.

Myasthenia Gravis. For a long time no lesions were discovered in this remarkable disease, and according to E. T. Bell¹ no characteristic lesions were described in the first 17 necropsies. In 1901, Weigert reported a case with a thymic tumor and numerous foci of lymphocytes in the skeletal muscles. In the majority of necropsies since 1901, lymphocytic foci have been found in the muscles, and the thymus has been frequently described as enlarged or the seat of a tumor. Bell has collected the reports of 10 cases of thymic tumor associated with myasthenia gravis, and adds one case of his own. Five of these tumors corresponded very closely in gross and microscopic structure. These thymic tumors are all comparatively small benign growths, composed of young thymic tissue. Many are hemorrhagic. According to Bell, this type of tumor occurs only in myasthenia gravis and some abnormality of the thymus is found in nearly half the cases of myasthenia gravis.

Of 56 necropsies on cases of myasthenia gravis that have been recorded since 1901, 17, according to W. A. Jones,² showed hyperplasia or persistence of thymus, and 10 of the 56 cases showed a thymic tumor. This gives a thymic involvement in nearly half the cases. All the thymic tumors except one have been of the benign type, as in a case reported by Jones. There is no satisfactory explanation to be found of the relation of the thymus tumor to the myasthenia gravis.

Kennedy, in discussing Jones's paper, said that persistence of the thymus was found in 5 out of 6 cases of myasthenia with necropsy observed at the National Hospital in London. In all 5 cases the thymus was as large as the hand and as thin as tissue paper, and consisted of a thin sheet of glandular tissue which spread down over the whole of the upper part of the pericardium.

Graves's Disease. From the investigations of Louis B. Wilson³ marked changes occur in the cervical sympathetic ganglia in Graves's disease. The degree of hyperpigmentation, the amount of granular degeneration, the atrophy and the reduction in the number of cells he found were in direct relation to the continuation and subsequent remission of the symptoms of hyperthyroidism. Parallel with this, the peri-

¹ Journal of Nervous and Mental Disease, February, 1917.

² Journal of the American Medical Association, November 4, 1916, p. 1354.

³ American Journal of the Medical Sciences, December, 1916, p. 799.

vascular connective tissue and the connective-tissue stroma generally throughout the gland were increased in direct ratio to the time during which the symptoms of hyperthyroidism had continued. In two of the cases there was marked sclerosis of the ganglionic connective tissue.

Though the number of cases was too small to permit positive conclusions, the observations seemed to indicate that early in acute hyperplastic toxic goiter there is present in the superior cervical, and probably also in some degree in the other sympathetic ganglia, a process which causes active stimulation, overfunction, and progressive stages of degeneration in the ganglionic cells. As the symptoms of exophthalmic goiter regress, evidence is found in the ganglia of the cessation of this degenerative process in the ganglionic cells not previously changed past recovery. After the acute toxic symptoms have entirely ceased for years, there remains little evidence of the destroyed ganglionic cells, most of the fatty pigmentary remains of the cells apparently having been absorbed.

NEW OCULAR SIGN IN GRAVES'S DISEASE. Suker¹ has observed in many cases of Graves's disease that after extreme lateral rotation of the eyes, either to the right or left, with the head fixed and with fixation of an object at this point maintained for a second or two, on attempting to follow this fixation point as it is rapidly swung into the median line, one of the eyes, it may be either, fails to follow the other in a complementary manner into proper convergence and fixation for this point when it is brought into the median plane. Either the right or the left eye makes a sudden rotation into the fixation with its fellow, but before it does so, an apparent divergent strabismus is manifest.

A muscle balance for esophoria or exophoria was taken in each case. In those in which there was an exophoria of greater or lesser degree, this apparent divergence was more marked than in those cases in which there was no exophoria. This apparent divergence was not as marked in cases in which an esophoria of any appreciable degree was present.

As an illustration, Suker says that if after extreme rotation to the right and fixation of an object in this position, the object is rather rapidly brought into the median horizontal plane, the left eye follows the object properly, but the right lags behind in the corresponding rotation into median plane fixation, but it eventually jumps into proper convergence and fixation with the left eye.

Magnesium Sulphate in Delirium Tremens. Twelve cases of delirium tremens have been treated by Leonard² with intraspinal injections of magnesium sulphate. Seven of the patients developed a paraplegic state in from one to two hours, following the introduction of the magnesium sulphate, with lost knee-jerks, lost plantar reflexes, and relaxation of both sphincters. The return of partial function occurred in from twelve to twenty-four hours after the development of the paraplegic state, and complete return of the reflexes occurred with complete motor power usually in from thirty-six to forty-eight hours.

¹ Journal of the American Medical Association, April 28, 1917, p. 1255.

² Ibid., August 12, 1916, p. 509.

The remaining five patients had weakness of the lower limbs with lessened reflexes. These patients had retention of urine. Other constitutional disturbances noted were that the temperature rose from 1° to 3° and the respirations became more rapid and shallow. There was also some acceleration of the pulse. Those patients who had developed a paraplegic state could speak only in whispers. In others there was no change in the voice.

The rapidity with which the delirium and restlessness subsided, with restoration to normal within twenty-four hours following this treatment, is certainly of value, in view of the little good sedatives do and of the high mortality among these cases, but the treatment must be used with great care.

Magnesium Sulphate in Tetanus. In a very careful and critical study of the effect of magnesium sulphate in the treatment of tetanus, H. E. Robertson¹ concludes that there can be no doubt in the minds of those who review the evidence that in this salt we possess a most valuable addition to our armamentarium in the treatment of tetanus. No such imposing array of facts can be brought forward in favor of chloral or allied narcotic agents, even granting their occasionally apparent good effects.

The drug must be used boldly, if its maximum therapeutic effect is to be obtained, and there are certain dangers, greater in some patients than in others. When this salt is being used the patient must be under constant expert attendance, with preparations already made for administering rapidly restorative remedies. The disease is a most desperate one, and remedies must be used as soon as possible to their therapeutic limits at the earliest possible moment.

Robertson believes one's duty is sadly neglected if, in addition to antitoxic serum, early vigorous and continuous efforts are not made to control the spasms, relieve the distress and pain, and give rest and nourishment by subcutaneous injections of magnesium sulphate in amounts large enough and given often enough to bring about the desired results.

Facial Spasm Treated by Alcohol Injections. It is important to bear in mind the distinctions between facial spasm and tic as given clearly by Dorrance.²

True facial spasm is a reflex act occurring in a single muscle or group of muscles, and is believed to be caused by some irritation in the muscles or the nerves of the spinal or bulbar arc. Tic is a voluntary contraction which has become a habit, it is a psychoneurosis and not a spasm.

In facial spasm, the spasm is confined to the mechanism of the motor innervation of the face, and is devoid of voluntary or involuntary control; whereas in tic, the movements are always more or less under the control of the will.

The spasm of the true facial type is never a natural movement, and cannot be imitated either by the patient or by a second patient. In

¹ Archives of Internal Medicine, 1916, xvii, 677.

² Journal of the American Medical Association, November 25, 1916, p. 1587.

tic the movement, however exaggerated, is a natural one and can be imitated.

At the onset of facial spasm, the spasm may be confined to only a part of a muscle. Later it implicates the entire distribution of the facial nerve and no more, and practically is always unilateral.

Tics never involve only a part of a muscle, and rarely involve all the facial muscles at any given time, but implicate associated groups of muscles. They are often bilateral.

Facial spasms are painful, and may be found in the mentally strong, whereas tics are found in neuropathic persons.

Dorrance describes a new method for alcoholic injection of the facial nerve for the relief of spasm, and those interested will desire the details of the original paper. Dorrance believes that most patients will willingly exchange a spasm for a paralysis, especially as the paralysis is only temporary. Voluntary motion slowly returns until complete function is restored. The spasm never recurs at the time of the return of voluntary power, but returns from a month to several years later. He believes that in some cases it never recurs. This fortunate result, I think, must be regarded as the exception.

Muscle Tonus. Mills¹ has devoted much attention to muscle tonus. He does not believe that strictly tonus is a fundamental quality of the pyramidal system. It is, of course, perfectly evident that muscle tone can only be exhibited through a neuromuscular apparatus of which the pyramidal cortex and the pyramidal tract are a part. There is a tonectic system, both cortical and ganglionic, distinct from the pyramidal apparatus. The tone must, so to speak, be delivered to the pyramidal system. In the cortex are differentiated tonectic centers, and the striatum, or a part of it, is a structure, one of whose functions is to associate cerebral tone so that it may be applied to synergized movements. In man, the centers concerned with tonic innervation are primarily cerebral and cortical. These centers of tone are charged by the inflow of sensation from the periphery, and also by the influx of ideational impulses, these being themselves primarily derived from sensation.

If tonic innervation is supplied to the pyramidal system and exhibits itself through the activities of this system, it is clear that for normal rhythmization of movement the pyramidal system itself must be intact. Pyramidal lesions, according to their location and extent, will interfere with normal tonic innervation. A complete transverse lesion of the spinal cord or of the internal capsule will block the transmission of tone-maintaining impulses to musculature innervated below the seat of the lesion. This would seem to be the explanation of the cases of flaccid or toneless paraplegia from transverse spinal lesions, and of some of the cases of flaccid hemiplegia from completely destructive capsular lesions.

When, as most frequently is the case, the lesions of the cord or of the internal capsule are incomplete, the tonectic apparatus remaining intact, innervation will be irregular or aberrant in its manifestations.

¹ Journal of the American Medical Association, November 18, 1916, p. 1485.

Like the motor cortex, the pyramidal tract has its functional subdivisions, and according to the retention or loss of the fibers of these subdivisions, will be the residual spasticity or flaccidity. Herein lies the explanation of many of the irregular phenomena of muscle tonicity exhibited in permanent contracture.

The hemiplegic musculature may be variously affected in other ways than simply by lesions of the pyramidal tracts. The withdrawal from the sensory pathway of the peripheral stimuli which contribute to cerebral tone by destructive lesions situated anywhere in the sensory pathway will eventually influence muscle tonicity. This is exhibited in the phenomena of hypotonia in advanced cases of tabes.

Mills brings forward a number of interesting clinical cases to support his arguments for a special tonecetic apparatus.

The Oculocardiac Reflex. In normal persons pressure on the eyeball causes a slowing of the pulse-rate through vagus inhibition. As Auer points out, this inhibitory influence is likewise shown through action on various sensory nerves or surfaces. Goltz observed standstill of the heart following rapid light blows on the abdomen of a frog, and this phenomenon was not noticed when the vagi were cut. In man the inhibition of this reflex is not infrequently seen in acute dyspepsia, peritonitis, a blow on the testes, etc. The afferent impulse in all these cases, carried to the central nervous system, causes a reflex activity of the inhibitory cells of the vagus.

Auer¹ has studied 37 cases of syphilis of the central nervous system and taken pulse tracings. He found that

1. Abolition of the oculocardiac reflex is among the earliest signs of syphilitic disease of the central nervous system and is one of easy diagnostic practicability to the general practitioner.

2. He found that this reflex was abolished on the side exhibiting the hemianalgesia with preserved tactile sensation in a case presenting the Millard-Gubler syndrome.

3. In only one case of well-marked tabes with cervical involvement in which pressure on the eyeball and testes was not painful was there evidence of diminished or disturbed superficial sensation other than in the case mentioned above.

The Importance of the Adductor Reflex of the Foot. Marie and Meige² have found difficulty in obtaining the Babinski reflex in soldiers with cranial wounds. Often the big toe does not move in either direction, and even where there is hemiplegia the extension of the big toe is not obtained. The explanation may be that the long marches, the long periods of standing, the long wearing of wet and ill-fitting boots may exhaust the sensibility of the plantar surface. They have found that instead of extension of the big toe, adduction of the foot often occurs when there are signs of implication of the central nervous system. This reflex is not new. Hirschberg, in 1903, called attention to it; he regarded it as indicative of a lesion, as he had never seen it in normal

¹ Journal of the American Medical Association, March 24, 1917, p. 901.

² Revue Neurologique, 1916, No. 3, p. 420.

conditions. He stated that the abduction of the foot always occurred with a positive Babinski, and when the latter fails the adductor reflex of the foot becomes of diagnostic value.

Marie and Meige conclude that the adduction of the foot is especially valuable in cerebral lesions. The Babinski reflex is valuable in lesions within the brain or motor tracts, the adduction of the foot is valuable when the lesion is more superficial, especially when cortical. It is the common permanent position in hemiplegia; it may be the only sign of the paralysis, and is the last to disappear.

The reflex may be sought with the patient sitting and his leg supported by the calf on the knee of the examiner, or in dorsal decubitus with the feet projecting beyond the bed, or in ventral decubitus the legs flexed almost at right angles with the thighs. The irritation should be applied along the inner border of the foot (not inner border of the plantar surface) and should extend from the big toe to the heel. In some instances the reflex may be obtained from irritation of the skin about the malleolus or other part of the leg. This sign should be searched for systematically whenever a lesion of the central nervous system is suspected.

Torsion Spasm. I have spoken in a previous number of *PROGRESSIVE MEDICINE* of the peculiar disorder first made known by Oppenheim under the name of *dystonia musculorum deformans*. Hunt¹ recently has described the affection as seen by him in six cases. He, like others, regards it as a progressive organic disorder of the central nervous system.

There is, in his opinion, a gradual loss of the mechanism which regulates and controls tonus during the voluntary, automatic and reflex activities of muscles. This causes a disturbance or loss of those reciprocal tonus activities of agonistic and antagonistic muscles which are a part of every complex or synergic movement. It runs a progressive course and then remains stationary, and resembles athetosis, and yet its typical form is readily differentiated from this affection. It is essentially a disease of childhood, but has appeared as late as the seventeenth year.

The face and muscles of articulation are not affected except in the terminal stage, when there is involvement of the muscles of the neck. There is usually a considerable degree of hypotonia. There may be a hemilateral involvement of the extremities which may exist for years. A pseudoparaplegic or paraplegic type may also occur. The torsion movements are diminished during rest, are increased by voluntary movements, and cease entirely during sleep. The trunk and lower extremities are chiefly affected, especially their proximal segments. The affection is incurable, and, with few exceptions, has appeared only in descendants of Russian and Polish Jews.

I may add to this description that in the case reported by me over three years ago the disorder has advanced so far that the man can walk only with great difficulty.

¹Journal of the American Medical Association, November 14, 1917, p. 1430.

Parathyroid Treatment of Paralysis Agitans. So little has been accomplished in the treatment of paralysis agitans that we read with interest Berkeley's¹ views regarding a method of treatment devised and employed by him over a considerable period of years. He believes the parathyroid glands to be of service, and recommends an acetic extract of the fresh glands (commonly though inaccurately called "nucleoproteid" extract) made by treating the ground or triturated glands with cold distilled water, filtering, and then precipitating with a very minute amount of acetic acid. This extract, in doses of one-fiftieth of a grain (either in capsule with milk sugar, or as a hypodermic solution) may be purchased. It is not very expensive, and it comes nearer to the chemical constitution of the human gland than any other preparation.

Berkeley believes this remedy will not cure paralysis agitans, but in 60 to 70 per cent. of the persons treated with it over a period of three to six months, great benefit will be obtained and the disease may be arrested, or much retarded. The preparation is without local effects of a disagreeable nature, and when given in the hypodermic solution in doses of fifteen minims, it does not even redden the skin, if it be injected with reasonable care.

Berkeley holds a view which many cannot accept, *viz.*, that paralysis agitans is caused by a deficiency of the parathyroid glands.

Muscular Dystrophy. The examination of the blood and urine in a case of progressive muscular dystrophy by McCrudden and Sargent² has given interesting results. The striking abnormalities were a low glucose and cholesterin content of the blood and the presence of creatin in the urine. The creatin in the urine they think suggests some abnormality of the glucose metabolism. Creatin is found in the urine in conditions like diabetes and starvation when sugar is not being properly oxidized, and in such cases is usually associated with acidosis, but they excluded acidosis in their case. They do not attribute much importance to the low cholesterin content of the blood, though it may indicate involvement of the adrenals.

The association of muscular weakness with hypoglycemia is striking in their opinion, as muscle gets its power through oxidation of sugar; and a low sugar content of the blood might be looked on as a sufficient cause for muscular weakness. McCrudden and Sargent call attention to the fact that many investigators have demonstrated the power of sugar to make exhausted muscles capable of more work. A direct relationship between muscular weakness and hypoglycemia has been noted by different investigators. Muscular asthenia alone, secondary to some other condition, is not necessarily accompanied by hypoglycemia.

Epinephrin and pituitary extract were used in treatment and a relationship was noticed between the improvement in the physical condition and the increase in blood sugar. Improvement in health, strength and weight was prompt and marked. They warn for the present against any attempts to treat by intravenous administration of glucose.

¹ Medical Record, July 15, 1916, p. 105.

² Archives of Internal Medicine, 1916, xvii, 465.

It must be remembered that the results obtained were only in one case, and, while very interesting, are not conclusive.

MUSCULAR DYSTROPHY AND THE PINEAL GLAND. It would seem from the paper of Timme¹ that this disease may be related to changes in the pineal gland. Of seven living members of a family afflicted with progressive muscular dystrophy to the fourth generation, all but two have been examined by Röntgen rays, and of these five, four show distinct changes in the pineal gland producing shadows in the röntgenogram. The fifth, a youth of fifteen years, shows an enlarged sella turcica, but no shadows in the pineal as yet. Timme makes the assertion that weighing all the evidence advanced by previous investigators to show derangement of the internal glandular balance in cases of progressive muscular dystrophy, and giving due significance especially to the changes produced by tumors and diseases of the pineal gland on the various tissues of the body, changes that resemble those present in progressive muscular dystrophy, we must admit the probability of a causal relationship between the two. If to this is added the evidence shown by cases of progressive muscular dystrophy of changes in the pineal gland demonstrated by röntgenology, the probability approaches pretty closely to proof that disturbances of the pineal gland play an important role in the pathogeny of progressive muscular dystrophy.

Timme examined 150 röntgenograms of the skull and found only about 2 per cent. with pineal shadow. The pineal gland is supposed to cease its function at puberty, if it does so earlier or later, the other glands partially compensate, producing their own peculiar symptoms in the endeavor to right the wrong. Occasionally this wrong is righted and a cure of the condition produced by the perverted pineal gland results.

There is still so much doubt as to the value of the pineal gland that all investigations of the function of this structure is welcome. It has been stated by McCord, for instance, that when this gland was fed to young animals such as dogs, guinea-pigs, chicks, rabbits, cats, it caused them to outgrow the control animals, both in size and sexual maturity. The addition of even small amounts of desiccated gland to the food is stated to be sufficient to produce marked results. It has been found that infant glands are more active than adult glands.

Frederick Fenger² has undertaken an investigation to determine the constituents and physiological activity of this gland and whether any difference exists in glands from different species and between glands from young and from mature animals. Cattle, sheep and lambs were selected. He has found that beef glands are relatively small and that both sheep and lambs contain much more pineal tissue per unit of body weight than do cattle. Infant glands contain less phosphorus and more total nitrogen than adult glands.

Pineal glands from both species show only slight contracting power on unstriated muscle. This is very much less than that produced by equal amounts of the posterior lobe of the pituitary body, and not sufficient to be of physiological significance.

¹ Archives of Internal Medicine, xix, No. 1, 79.

² Journal of the American Medical Association, December 16, 1916, p. 1836.

Since the actions of pineal glands, both on the blood-pressure, the pulse-rate and the excised heart, as well as on the uterine and intestinal muscle, are insignificant in therapeutic doses, and since health is not influenced by extirpation of the gland he concludes that it becomes difficult, at least with our present knowledge of physiological chemistry, to accept or even consider the pineal body as an internal secretory organ of medicinal value.

Retrocursive Epilepsy. Epilepsy may assume many types, the patient for example may walk or run in a circle, circuncursive epilepsy, or may run forward, procursive epilepsy; or may, as Mingazzini¹ has recently described, go backward. A patient of his in the onset of his epileptic attacks took several steps backward and after covering a few yards in this way, fell to the ground.

¹ *Revue Suisse de médecine*, 1916, No. 11.

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